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MARCH 1952

BUSINESS · ENGINEERING · INDUSTRY

To Build Democracy in India — Page 19

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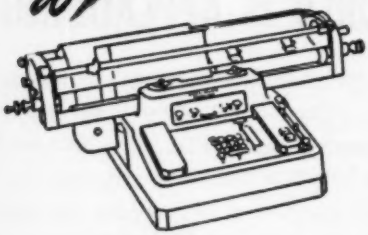

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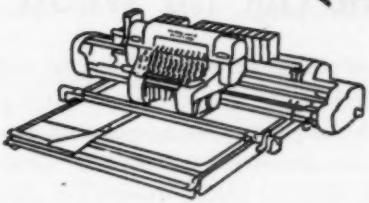

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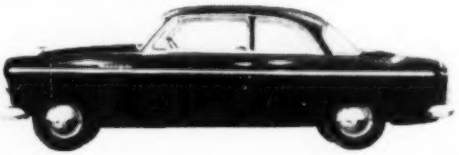

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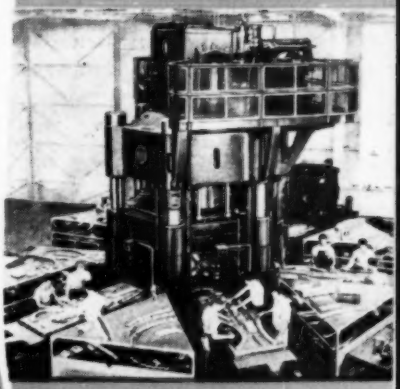

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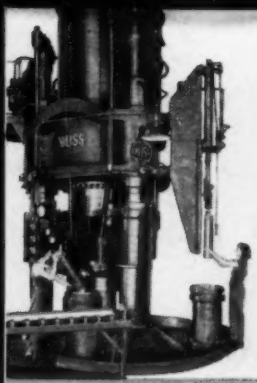

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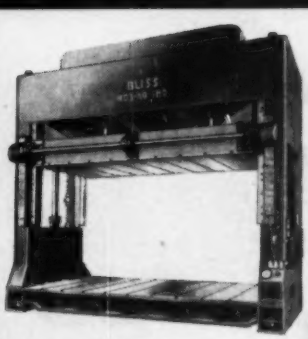

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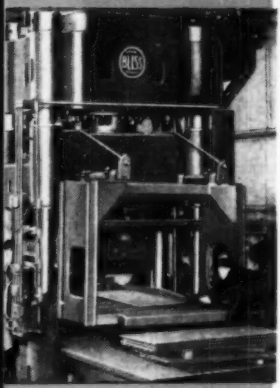

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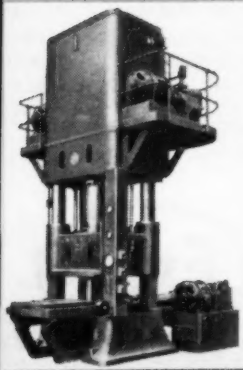

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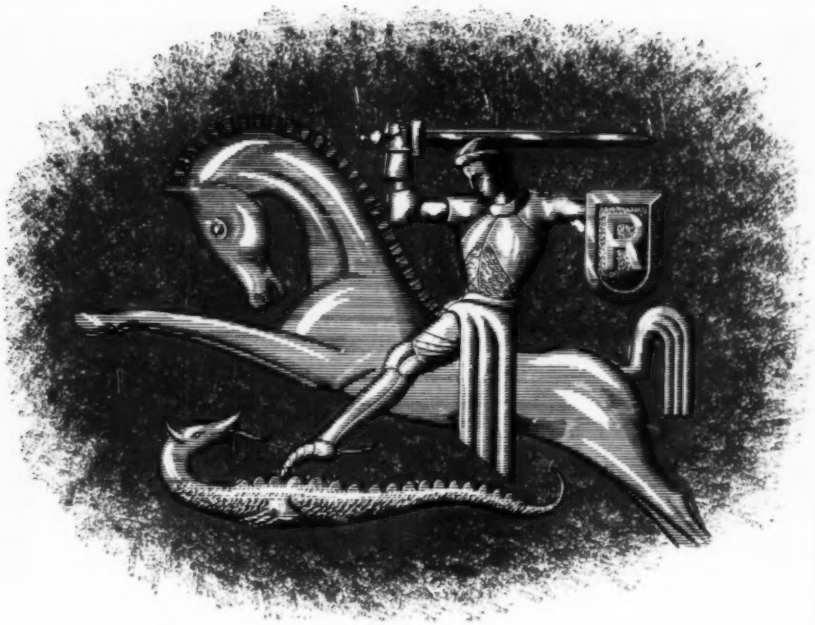


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# BUSINESS TRENDS

**U. S. INDUSTRY** plans record capital spending in 1952. According to McGraw-Hill's annual survey of business plans for new plants and equipment, industry plans to spend $21.2-billion—12.8% more than the record amount invested in 1951. Manufacturing industries account for almost $13-billion, with mining, railroads, other transportation, communications, and utilities making up the rest.

**Defense industries** and industries producing basic materials plan the largest increases in investment. Spending for steel is expected to increase by 25%; chemicals, 16%; transportation equipment (mostly aircraft), 78%; nonferrous metals, 60%; petroleum, 38%; electric utilities, 24%; and electrical machinery industry, 128%.

**Emphasis on defense and basic industry** fits in with the government's mobilization program, which aims to create an industrial base large enough to support a big defense program along with a big civilian economy. Capital spending in some primarily civilian industries, such as food and textiles, will be down considerably in 1952.

**U. S. manufacturing capacity** will jump 8% in 1 year if all investment plans are carried out. Coming on top of last year's increase, it will put manufacturing capacity a full 16% higher than it was in December 1950.

**Record industrial expansion** means continued heavy demand for key metals and metal products in 1952. For other countries, it means continued pressure on supplies and prices of industrial raw materials—and continued difficulty in importing industrial machinery from the U. S. But in the long run, expansion means the U. S. can turn out more goods for export.

**This year may mark the peak** of the postwar industrial expansion boom. Most of the defense expansion will be finished. Civilian industries are not expected to close the gap in capital spending left by falling defense work.

**But capital spending will stay high for years** if U. S. business carries through with its present intentions. The McGraw-Hill survey shows that industry has preliminary plans to invest $16.7-billion in 1953, $15.1-billion in 1954, $14.1-billion in 1955.

**These figures are huge** compared to investment in most past years, although well below plans for 1952. Planned spending for 1955 is larger than actual spending for new plant and equipment in any past year except 1948 and 1951. And future investment could be even higher; many companies still have not made their plans as far ahead as 1955.

**These plans are only tentative**—they will change as business conditions change. A drop in business activity or a shortage of money for investment would make

actual spending lower. Booming business might make industry plan for even more new plants and equipment.

**All this is good news.** Economists have been worrying about what will happen when defense and capital investment taper off. They are considered to be the two key forces now keeping U. S. business at a high level. But if capital spending stays as huge as the survey indicates, prospects for future prosperity are considerably brighter. Heavy capital spending means good business especially for U. S. metalworking industries, which employ fully one-third of all U. S. manufacturing workers.

**BURLAP USE** in the U. S. is dropping—because of high price, availability of good substitutes. The U. S. consumed 534-million yards in 1951, the smallest amount in 18 years, except for World War II. Consumption dropped 32% in 1 year.

**Indian export duty is mainly responsible for the drop.** It keeps burlap prices much higher than those of domestic substitutes. So use of substitutes like paper is growing fast. U. S. started using paper during the last war when burlap was short. Now paper has taken over the entire field of smaller packaging.

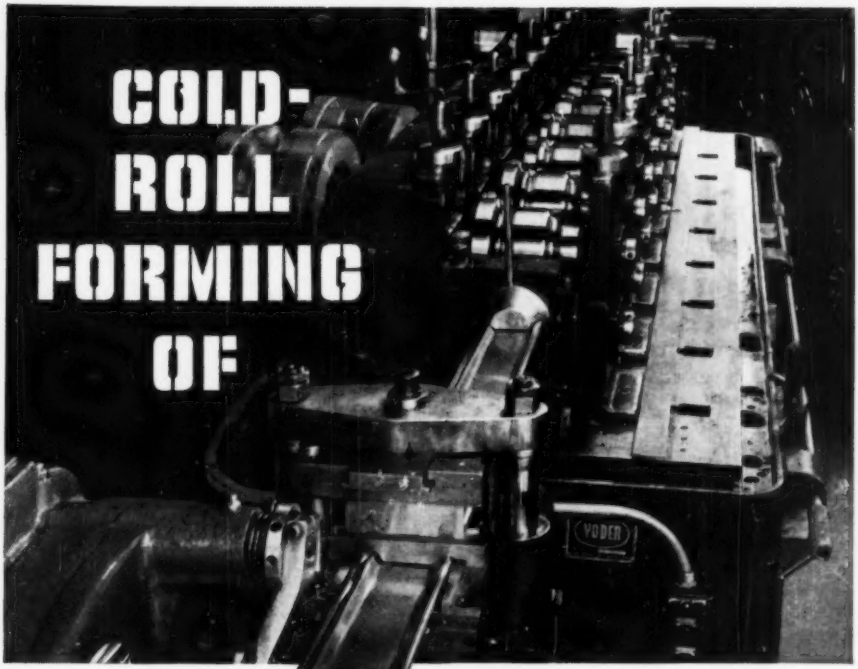
**U. S. will use more burlap** if the Indian duty is lowered. But part of the market is already permanently lost to substitutes. And burlap's long-range U. S. market will continue to shrink as long as the high price encourages development of more and better domestic substitutes. Production of Kenaf, which contains a jute-like fiber said to be superior to jute, is now being pushed.

**U. S. CHEMICAL INDUSTRY** is living up to its reputation as a top "growth industry". Huge investments in plants and equipment boosted capacity by 10% in 1951, should increase it by another 11% this year. Government is supporting this expansion by granting rapid tax amortization privileges covering facilities to produce more than 100 basic chemicals.

**This is not just a short-range mobilization program.** Industry and government figure on a long-run increase in demand for chemical products. So expansion goals for some chemicals run years ahead. Here are some for 1955:

**Phenol**—623-million lb., 82% more than in 1951.
**Phthalic anhydride**—368-million lb., up 163% over 1951.
**Nitrogen**—2.9-million short tons, over double 1950 production.
**Sulfur**—8.4-million long tons, 2.3-million more than in 1950.
**Chlorine**—3.4-million short tons, up 1.2-million in 5 years.

**New chemical products keep appearing.** One of the latest is for agricultural use. Called Krilium, it is produced by Monsanto Chemical Co. (see p44)—will be available for export in 1953. Some older chemicals also are becoming more available—and are beginning to show price softness.

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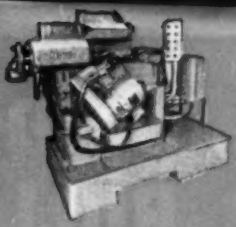

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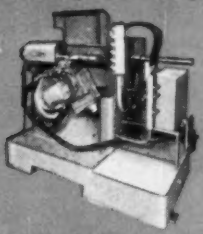

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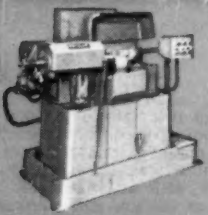

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# WASHINGTON REPORT

**U. S. CONGRESS** will be tough on all foreign economic assistance measures this year. This is an election year.

**Congress is sure to slash** about $2-billion off President Truman's request for $10.8-billion worth of aid. That will postpone General Eisenhower's hopes for a 30- to 40-division modern army on the continent by year's end.

**Just how much European rearmament will be hurt** by Congress will depend on where the cuts are made. Deep slashes in economic aid would hurt more than the same cuts in aid for military end items because the main threats to European rearmament are the balance of payments crisis in Britain and inflation in France. They cannot be helped by arms deliveries. Also more of many types of arms can be produced per dollar of aid in Europe than in the U. S.

**But most congressmen believe** that military aid is more popular than economic aid with the voters. So the axe is bound to fall hardest on the $2.5-billion worth of economic assistance asked by Truman. Even the administration is following this line.

**The Pentagon** has the Mutual Security Agency (MSA) on the ropes these days in administration battles over the use of foreign aid. Example: Defense Department fought strongly against transferring $300-million from its end-item funds to give to Britain as economic aid, delayed the transaction dangerously. The transfer finally was made. But only on the condition that the money be used for military production. That will reduce sharply its economic effectiveness.

**The British economic outlook** highlights the dangers of slashing economic aid. Washington experts expect British reserves to drop another billion odd dollars in the first half of this year—even if Churchill's drastic deflationary policy works. And many U. S. economists think a deep deflation would dangerously weaken the British economy in the long run.

**You can see plenty of signs** already that Congress is in a tight-fisted mood. Senators are cold-shouldering Ambassador Chester Bowles pleas for $1-billion worth of loans and grants to India over the next 4 years (see p19). And the Senate has killed a move to scrap the ban on imports of fats and oils; this ban has hurt Europe's dollar earnings.

**Hard-pressed European nations** that have been counting on promised off-shore procurements to make up for aid cuts will be sorely disappointed. The theory of off-shore buying was that the Pentagon would place armament orders in countries that were short on aid.

**But Army procurement officers** will buy where they can get the best hardware cheapest, regardless of general economic needs. So far there has been no off-

shore procurement to speak of anyway. It will expand slowly if at all. And payment will be slow in coming.

**U. S. PURCHASES** of zinc, lead, and tungsten will climb as a result of Congress decision to lift tariff duties on these metals. U. S. importers will be able to pay higher prices abroad and still stay under domestic price ceilings.

**The U. S. program** for developing production of scarce raw materials abroad has hit two snags since it was transferred from ECA to the Defense Minerals Production Board:

- **A jurisdictional squabble** over whether DMPB can invest its fat funds in MSA—formerly ECA—areas. MSA argues that large injections of development capital would throw its whole economic aid program out of kilter.

- **DMPB so far is not set up** to develop the transportation and communication facilities that frequently must proceed large scale expansion of raw-materials production.

**WASHINGTON IS GLOOMY** about the Far Eastern outlook even if there is no immediate outbreak of war there. More and more U. S. Far Eastern experts figure free Asia will be sucked inevitably into the Communist whirlpool if the West does not develop a positive policy to put Communism on the defensive.

**But nobody in Washington** has any blueprint for a positive Far Eastern policy. And it is certain that there will be no positive policy made in any sphere until after the election.

**LOOK FOR** a crack down on over-pricing of exports designed to help foreign buyers build up private dollar balance in the U. S. This is a favorite device for exporting private capital from countries that have tight exchange controls.

**The American exporter** puts a phony markup on his product and credits the foreign buyer with the difference. The foreign government pays the bill out of its foreign-exchange reserves. Over-pricing deals will have to be approved by the Office of Price Administration from now on.

**European exports to the U. S. will sag** this year according to Washington economic prophets. American buyers are getting wary, particularly in soft goods lines. But anything made of steel will still be snapped up. Demand for European machine tools, for example, is skyrocketing.

**This will be the peak year for shortages** of nonferrous metals and sulfur, the International Materials Conference predicts. Cotton too may have to be allocated again. IMC is trying to work out a way to lengthen its allocation period from 3 to 6 months to help industrialists plan ahead.

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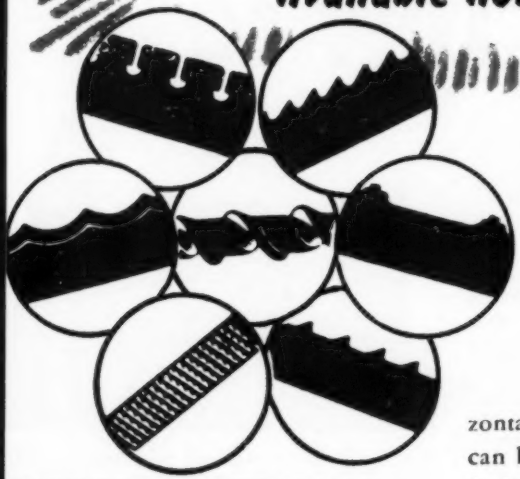

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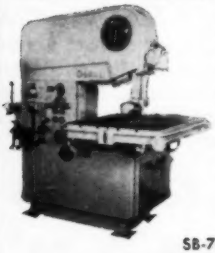

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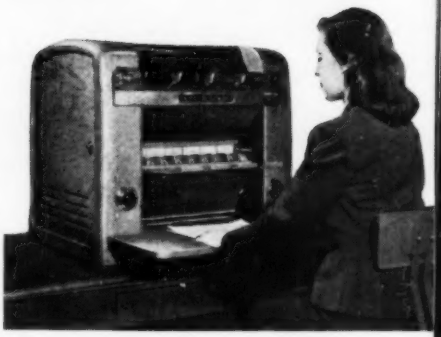

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and spoil . . . it is a Freedom
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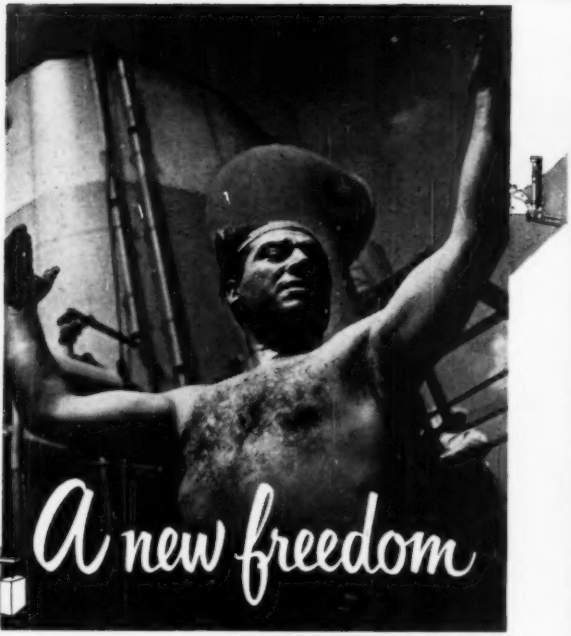


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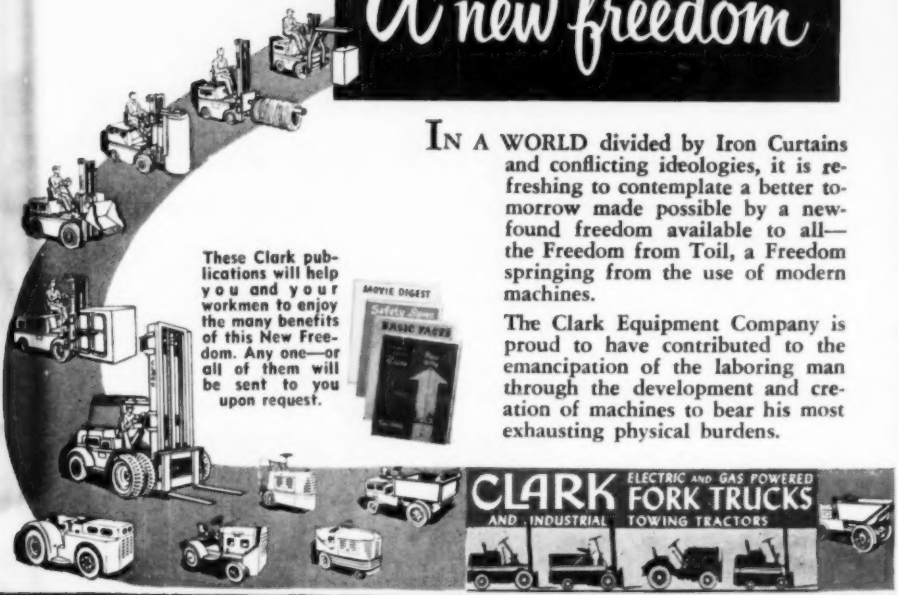


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*INDIAN ENGINEERS study proposed water supply and irrigation projects in huge hydraulic laboratory spread out over 30 acres below water-supply dam for Poona. Projects will help . . .*

# To Build Democracy in India

**Point-Four aid to India aims at raising living standards through better farming methods, thus assuring a free democratic India**

THE U. S. has embarked on a new economic and diplomatic policy in India. Economically, it will involve putting about $300-million in Point-Four aid into the country over the next 4 years. Diplomatically, it will attempt to live with Indian neutralism until India is able and willing to step firmly into the anti-communist camp.

The new policy already has been launched on both the economic and diplomatic fronts. A first $54-million slice of Point-Four aid recently was handed to Nehru. And Chester Bowles, energetic new American ambassador to India, has begun forging a new type of diplomatic relationship.

Behind the new approach lies a fundamental policy decision of the U. S. government. It is that India is the keystone of the West's defensive arch against communism in Asia.

U. S. policy-makers have become convinced that if India fails to raise its standard of living faster by democratic means than China does by totalitarian means, India will go the way China has gone and the whole of Asia and the Middle East will go with it. Africa could follow.

There is still time in India—as there is not in Indochina, Burma, Malaya, and the Middle East—to prove that democracy and free enterprise have

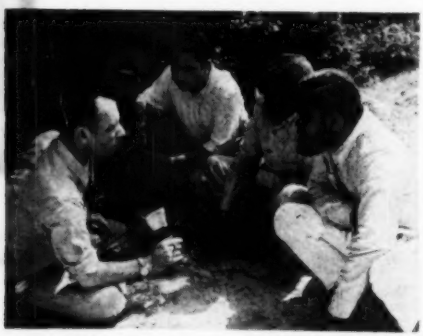
faster, better solutions to the problem of the misery of the Asian masses than communism has. But the time is short. The tide of popular discontent will turn heavily against Nehru and democracy if he does not substantially meet the targets of his 5-year development plan, which has only 4 more years to run.

Here are the main challenges that the new U. S. policy will have to meet on the economic and diplomatic fronts:

• **India's economic problem** is desperately simple. It is to grow enough food to ward off famine and pestilence from its mushrooming population. No basis will exist for modern industry or an expanding economy until this job is done. And the political basis for democracy also will remain unsound.

The Indians are attacking the food deficit on two fronts: *increasing irrigation* and *improving agricultural methods.*

Already India has twice as much land under irrigation as any other country in the world—20% of its total land area. The 5-year plan calls for irrigating an additional 8-million acres of land through river development projects. There are 124 such projects under way now. They currently are costing the country $1-billion a year out of its own pocket. The world has helped out on some of them with a $24-million loan. This program, when completed, with provide an extra 3-million tons of food a year.



***POINT-FOUR** program head, Horace Holmes, discusses farm problems with Indian leaders*

The Five-Year Plan also called for building 1-million new water storage tanks to hold the monsoon rains. These would make it possible to irrigate another 9-million acres of land, to grow another 4-million tons of food per year.

Improvement of agricultural methods will have to plug the remaining food deficit of 3- to 5-million tons expected in 1956. Some bold first steps already have been taken in this field.

## Farm Output Up 46%

A Point-Four experimental rural development program has boosted agricultural output 46% in the last year in a 100-square mile area at Etawah near Delhi. The program was directed by Horace Holmes, a Tennessee farmer. He got his results by persuading the Indian to use better seeds and planting methods, steel ploughs instead of wooden ones. He also improved the design of home-made native tools. Schools and public health centers were developed side by side with the agricultural program. Malaria was wiped out in the area.

## From Tents to Homes

A typical community that was rehabilitated under the Etawah program was Faridabad. A year ago it was a disease-ridden tent city where 30,000 refugees huddled in starving misery. Now 5,000 of them are living in block homes, which they built with their own hands. The homes even have running water. About 3,000 more families will be housed soon.

A 150-bed hospital has been built and public health centers adequately take care of the whole population. All the children are in school. More than 4,000 industrial jobs have been created in new textile mills and other light

industries. About 4,000 more jobs are expected to open up in the next few months.

This renaissance was achieved with a $5-million Point-Four loan. Etawah has set a pattern for future Point-Four operations in India. Fifty more similar rural development centers will be set up this year. Each will reach about 200,000 farmers. This program will be directed by 2,000 Indians who have been trained in modern agricultural extension methods. Plans call for creating 50 new rural development centers each year until the whole of India is covered at the village level.

The money for this big job will come from a joint Indo-American fund set up under Point Four. This year the U. S. has put up $54-million. India will contribute about $100-million worth of rupees. The whole program will cost the U. S. about $300-million, in loans and grants, over the next 4 years.

### *Land Reform Needed*

One other big problem—land reform—will have to be solved if the planned increase in agricultural production is to be effective in killing communism at the grass roots. Nehru has drafted a land redistribution program. But it has been successfully fought by the large landholders and is lagging badly. Redistribution of land is hard to do in a democracy.

And the success of the agricultural program probably will depend on whether the Indians get more wheat loans from the U. S. to finance the huge food imports they will need during the next few years. The administration probably will ask for another wheat loan this year. Such loans serve the double purpose of generating good will and generating counterpart funds that can be ploughed back into the agricultural development program. The State Department is confident that India will pay these loans—if it does not succumb to communism first.

***STEEL PLOW**, introduced by Holmes, replaces pointed wooden stick on India's farms*

U. S. aid, big as it is, still will be marginal in the multi-billion dollar Indian Five-Year Plan. Most of the money will come from the Indians themselves. But the U. S. contribution could be decisive in keeping India on the right side of the Iron Curtain.

Large-scale industrial development will not be possible in India until this broad agricultural base has been built to support it. Even then, industrial expansion will not be easy.

Capitalism is misunderstood in India. The brand of British monopoly capitalism imported in the past insisted on 30 to 40% profits, which it refused to plough back into the Indian economy. If the economy is to be modernized, foreign investors will have to be found who will accept a reasonable profit and develop Indian resources on the spot.

Nehru is anxious to attract foreign capital on these terms. India recently gave American oil companies a good deal and has announced its willingness to offer even better terms to other American investors.

But public investment still remains

***FRONT COVER**—Teams of oxen draw water from a well to irrigate land.*

the main hope of getting industrial development started on a large scale in the next decade. India will have a half billion dollars worth of foreign exchange per year to put into industry if it succeeds in eliminating its food imports. And there is a lot of room for industrial development. The country has the largest untapped iron resources in the world and large manganese deposits. Yet today, it has to import 1-million tons of steel and 1.5-million tons of pig iron every year to keep its village foundries operating on a primitive basis.

• **The big diplomatic problem** that the new U. S. policy will have to face is the deep-seated Indian neutralism. This will make it hard for India to get the amount of aid from Congress that it needs to stop the spread of internal communism. It also may prevent India from taking effective action in neighboring Asian and Middle Eastern countries to keep from being outflanked by communism.

Indian neutralism springs from four main sources:

1. Hinduism tends to create attitudes of aesthetic and benevolent detachment from worldly struggles. In other words —neutralism.

2. The Indian subcontinent is geographically isolated.

3. India's special relationship to Russia and China. They saw a close similarity between Russian and Chinese economic problems and their own. They are now pretty generally disillusioned in the Soviet experiment. But they still hope that China eventually will break with Russia when it gets strong enough.

4. Economic problems would make all out participation in the free world's defense effort difficult. Raising and equipping a 2-million man army would destroy the delicate balance of the Indian budget.

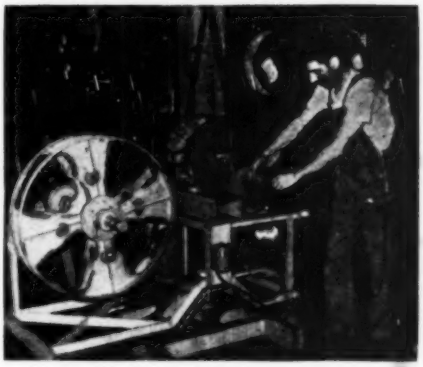
U. S. diplomats are not much concerned about Indian neutralism at this stage. They think the biggest contribution the Indians can make to strengthening the free world in the next few years is to make democracy work at home.

***WORKERS, using primitive hand methods, build Nangal Dam for irrigation diversion***

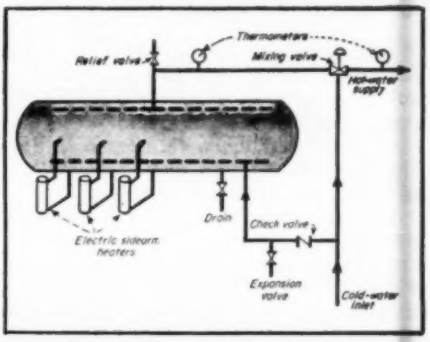
The U. S. State Department is evolving new techniques for dealing with Indian neutralism. Instead of telling the Indians what they should do, it is concentrating on patiently confronting them with the facts of communist imperialism and letting them draw their own conclusions. And U. S. diplomats are making an attempt to get out into the villages and talk to Indians at the mud-hut level. Ambassador Bowles himself has traveled over 8,000 miles in the last 3 months, talking to peasants over the country.

U. S. diplomats say this technique of persuading instead of pushing is gradually pulling the Indian viewpoint closer to the American one. They are confident that when the chips are down the Indians will be on the side of the free world, but they believe they must be lured, not bludgeoned, into taking sides.

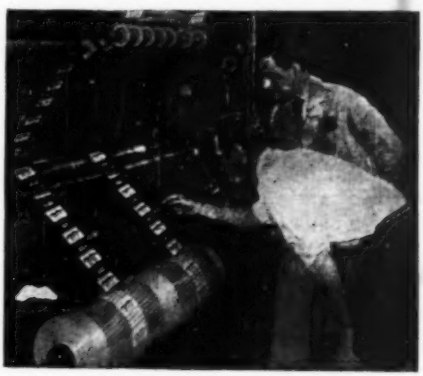
# This Month's How To . . .



. . . **measure wire rope** is a fast job at T. S. McShane Co., Omaha, Neb., distributor. The device, consisting of a timer, motor, and empty spool, automatically measures any desired length of rope or cable. When an order is to be filled, the desired stock spool of rope is slipped over an axle. One end of the rope is passed through the device and onto the empty spool. An operator sets the timer for the required number of feet and starts the machine. Unattended, it reels off the necessary footage and automatically stops.—Ind Dist, Jan, p120




. . . **heat hot water** by electricity and still keep it inexpensive is illustrated by piping diagram for electric hot-water accumulator. Heating is done, usually at night, when plant electric demand is low and power is cheaper. Electric side-arm units heat water to 250° F. Water is piped to three-way mixing valve and mixed with cold water to desired temperature. Up to 90% of stored water can be used if feed pipes for injection and withdrawal are perforated; this gives even injection and withdrawal.—Power, Jan, p86



. . . **print on cellophane** is answered by aniline ink, once looked down on by printers as "rubber-stamp ink", but now gaining acceptance in packaging fields. These inks are used on variety of materials—from kraft paper and cotton cloth to cellophane, polyethylene, and Pliofilm. They are usually pigment, not dye, inks. Printing is done with embossed rubber rollers. Main use is in short-run label and package printing. Gravure printing with engraved copper cylinder is cheaper for large quantities of labels or cartons.—Chem Wk, Jan 12, p29

***PHOTOELECTRIC bridge spectrophotometer eliminates human element in . . .***

## Grading Tomatoes by Color

When tomatoes are graded, they are inspected for several factors, including color. Usual color grading method is comparison with color photographs.

A new instrument (above) now does the job quickly, simply, positively. It is made by Magnuson Engineers.

Sample tomatoes are cut in half, placed in spring-supported cradles in the drawer, and moved into the tester. Phototubes view them through red and blue filters while they are illuminated by neon and mercury-vapor lights.

The ratio of red reflectance to blue reflectance, as indicated on the dial, represents the maturity of the tomato. The scale is calibrated to indicate three classifications of ripeness.

Principle of the device's operation is based on the relationship of the spectral reflectance of tomatoes and their maturity. Spectral-reflectance curves show two distinct plateaus—one at 400 to 520 millicrons and the other at 640 to 740 millicrons. The ratio of monochromatic reflectances in the two bands forms a dimensionless function that indicates tomato ripeness.—Electronics, Jan, p92

## Pickling and Nickel Plate Are Keys to One-Coat Enamel

Another one-coat enameling process (McG-H Digest, Dec '51, p38) has been announced. It was developed jointly by Republic Steel Corp. and Ferro Corp.

The process follows the usual cleaning and rinsing steps. Then the steel is given a special pickling treatment that produces a sharper etch than the conventional sulfuric acid pickle.

The nickel deposition is brought about by chemical reduction. No iron goes into the solution as in the usual nickel dip where the deposition action is non-galvanic. This type of deposition (by chemical reduction) provides the rough surface needed to give the steel the required adherence quality. Enameling is then done by conventional methods.

Advantages claimed for the one-coat finish: (1) increased resistance to impact, thermal shock, and torsion because of thin coating; (2) product can be bent, sheared, sawed, and drilled; (3) surface, reflectance, and color quality equal those of conventional porcelain-enameled surfaces.—Ceramic Ind, Dec, p73

## Filters Extend Tool Life

Magnetic separators and filters at Warner Gear Division, Borg-Warner Corp., remove metal particles and grinding-wheel grit too small to settle out of cutting oil. Assemblies are thus kept free of foreign particles.

Other advantages are longer tool life, improved surface finish, less clogging of oil pumps, and longer cutting-oil life.

Where filters are employed on centerless grinders, coolant is now changed monthly instead of several times a week. Filter material ranges from paper to unwoven rayon.—Iron Age, Dec 20, p103

## How To Rehabilitate Worn-Out, Narrow Pavement

The Illinois State Highway Dept. is rebuilding a worn-out, inadequate concrete pavement in four steps: (1) patching for strength, (2) widening for safety, (3) undersealing, and (4) resurfacing with asphaltic concrete.

Before patching, the old pavement is removed with pneumatic pavement breakers. Patches are made with wet-batched air-entrained concrete, vibrated and screeded level with the adjacent pavement.

Pavement is widened before undersealing is done. No side forms are used. A patrol grader strikes off the shoulder. New pavement trenches are also excavated by the grader. A smooth-wheel roller compacts the material.

Undersealing is done with petroleum asphalt at temperatures from 400 to 475° F. Holes for receiving the asphalt are drilled by a tractor-mounted drill. Asphalt is forced into the holes at 60 psi. Pressure is applied until the asphalt breaks out at the cracks.

The final step is resurfacing. Asphaltic concrete is placed in two courses —a leveling and binder course followed by a surface course. Prior to placing the binder course, the concrete pavement is given a prime coat of rapid curing asphalt.—Eng News-Rec, Dec 6, p30

## Fork Trucks Move Tanks

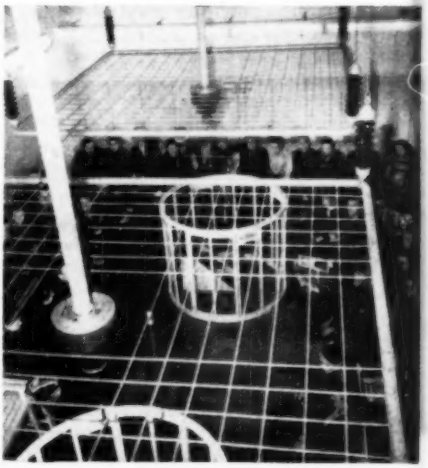
Portable tanks overcome some of the problems of bringing fluids to the packaging lines at Upjohn Co. Tanks are moved by a hand-operated fork truck and are easy to maneuver. Scheduling for production and packaging is more flexible.

Tanks come in two sizes—1,000 gal. and 500 gal.—and are glass lined. An agitator on each tank keeps the batch homogeneous during the packaging operations.

An I-beam ring supports each tank. Attached to the ring are four casters. Battery-operated, hand-guided fork trucks, equipped with special bumpers and engaging blocks to permit automatic coupling with the ring, move the tanks.—Mod Packaging, Nov, p102

## Underwater TV for Divers

U. S. Navy protects and aids divers with underwater television cameras. TV explores undersea areas and helps divers spot and prepare for dangerous situations. In addition, the cameras can observe the work of divers, making possible shipboard coordination of underwater activities. Either a broad view or a close-up of an area is available from controls on shipboard.—Marine Eng, Jan, p84



**RELIEF FOR SILICOSIS**

**German doctors are trying a new treatment for silicosis on afflicted workers at Rosenthal Porcelain Co. Fine spray of mineral water is kept afloat by electrostatic field. Theory is that it penetrates lungs and affects cure.—Chem Wk, Jan 12, p26**

## Textile Advances Include Dynel Dyeing, Rayon Coating

Two recent discoveries in the textile field will encourage wider use of synthetic fibers.

• One is the development by Union Carbide & Carbon Corp. of a practical method for stock dyeing its Dynel—an acrylonitrile—vinyl chloride interpolymer. Attempts at dyeing Dynel have generally been based on some sort of swelling treatment—mechanical or chemical—to loosen up its molecular structure. But getting full shades has been nearly impossible.

The new method utilizes copper in its lower valence state. In mixed acid and acetate dye formulations, dyeing is done at a boil for 20 min. Sulfuric acid is added to adjust acidity. After another boil, copper sulfate mixed with a reducing agent, such as zinc formaldehyde sulfoxylate, is added until the right degree of dye exhaustion is realized.

The cuprous ion may cause a simple swelling effect. But a more plausible theory is that it catalyzes hydrolysis of nitrile groups to amide and carboxyl groups, thereby boosting Dynel's affinity for water. Or a copper complex may form between the acrylonitrile and the dye.

• The other discovery, made by Dan River Mills, is a fiber modification to replace resin coatings normally given to viscose rayon fabrics to prevent shrinkage and to improve crease resistance. The new fiber will not absorb chlorine. This means that white viscose rayon fabrics will now be commercially practical.

The process, called X-2, changes the type of bond linking the cellulose fibers together. It substitutes, for hydrogen bonding, an ether linkage, which in turn is linked ether-wise to a cellulose molecule.

Processing can be done in regular textile machinery. Nature of the reagent has not yet been revealed because of the patent situation.—Chem Wk, Nov 24, p43

### In This Issue

. . . as in every issue, you will get valuable business and technical information from the advertisements. Study them and you will find how to:

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- Plan plant lighting.
- Choose hydraulic presses.
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- Make paper stronger.

Advertisers in this issue describe these and many other specific business aids and offer you catalogs or individual engineering information if you will write directly to them.

## Metal Plating on Plastics

Phenolic, styrene, and vinyl plastics may be plated with a hard film of copper, silver, chromium, or other metal. The plastic items are more resilient and lighter than solid metal, and are resistant to heat, abrasion, and weathering. They can replace metal parts on automobiles, airplanes, railroad cars.

Parts are first sandblasted or tumbled, then dipped in a sensitizing solution. A conductive bond coat of silver 0.00001 in. thick is given to the parts. Bond-coated items then get a 0.002-in. copper plating in a copper salt solution. A thin coat of the desired metal is plated over the copper base in an electroplating tank.—Auto Ind, Jan 1, p49

*MARBLES are remelted and drawn out into . . .*

*FIBERS with many uses. One of them is a . . .*

*FABRIC that is fireproof, shrinkproof, and rotproof.*

# Glass-Fiber Use Expands

**Successfully established in many products, fibrous glass is headed for use in paper, tires, and electrical insulation**

FIBROUS GLASS is finding applications in many new places because it has an unusual combination of properties and it is cheap. It is made from sand and limestone melted and formed into glass marbles. Then the marbles are remelted, forced through pinholes, and drawn out as fiber 0.00023 in. thick. Drawing glass so thin makes it highly flexible. Fibrous glass is also one of the strongest materials; tensile strength is about 230,000 psi.

Stability is another virtue of fibrous glass. Because a glass fiber is really a glass rod in miniature and not cellular, like a natural fiber, it does not absorb moisture. So it does not swell, shrink, or stretch. The fibers are practically inert to acids and alkalies; they do not rot or deteriorate, and they cannot oxidize.

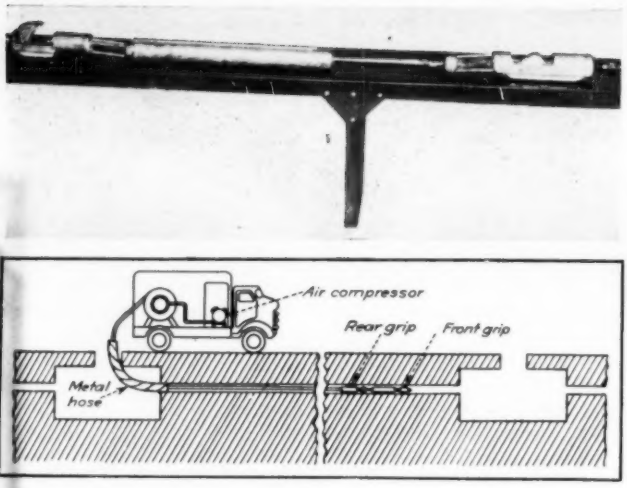
These qualities have established fibrous glass in a long list of products ranging from curtains and drapes to battery separators and home insulation. A new application is in reinforced paper, a tough wrapping for all kinds of industrial products. It is replacing sisal and jute.

Fibrous glass may soon move in on baling twine. Owens-Corning Fiberglas Corp. has underway an intensive development and test program with twine makers on a product consisting of a glass yarn core with a paper wrapper.

Another possibility is in tire cord. Glass fibers beat nylon and rayon for strength. But research is needed to overcome abrasion from glass fibers rubbing over each other.

Because glass fibers resist heat and moisture, they are competing with cotton in electrical insulation. Recently Fiberglas learned how to dye the yarn so the color would hold up in wiring. Glass-insulated wiring is being tried for ignition harnesses on automobile engines.

It took a lot of research to make potentials turn into reality, but now it looks like fibrous glass is ready for a bright, prosperous future.—Business Wk, Dec 29, p42




**MECHANICAL MOLE**

**At Commonwealth Edison Co., small compressed-air reciprocating engine equipped with duct grips propels itself through duct dragging its air hose behind it. Grips open and grip in sequence to give forward motion. At end of line, hose draws "pull" line through duct. — Elec World, Dec 31, p75**

## Prepackaging of Vegetables Keeps Farm-Fresh Quality

Prepackaged, ready-to-cook vegetables are getting more popular in the U. S. and mean more profit to packers. Dickman Farms in Florida has been successful in retaining farm-fresh quality by fast movement from field to market, coupled with chilling at the farm. The program consists of:

1. Delivering vegetables to prepackaging plant within 15 min. after picking.
2. Mechanically conveying vegetables through cleaning, trimming, and sorting—and, for corn, through husking and cutting to size.
3. Precooling vegetables for 13 to 15 min. with chlorinated water at 33 to 37° F. Bath brings produce temperature to 40 to 42° F.
4. Further cooling of vegetables held in wire baskets in cold-storage rooms at 30° F. From 3 to 8 hr. are needed to reduce temperature below 40° F. level.
5. Packaging in pulpwood trays, which are over-wrapped with cellophane and heat-sealed just before shipment. Individual cartons are placed in master cartons with 1-in. ventilation holes.
6. Shipping in mechanically refrigerated trucks.—Food Eng, Jan, p96

## Rope Pumps Water

In experiments at the University of Illinois, water was pumped from one level to another without pipes, valves, or buckets. All that was needed was a rope, two pulleys, and a motor.

The setup consisted of a clothesline spinning around two pulleys, one of which was driven by the motor. Water was raised by the up-bound rope and thrown off when it passed over the top pulley. The bottom pulley was weighted down to keep the rope from tangling on the way down to pick up more water. The pump raised 12 gpm. about 25 ft.

While not new, the idea has merit for farmers and others interested in a simple pump which can be rigged up from materials found almost anywhere. —Eng News-Rec, Nov 29, p57

## Cotton-Fineness Studies Pay Off at Mill Level

Blending of cotton by fineness determination is being done at Joanna Cotton Mills Co. By setting up four fiber-fineness groups (3.2 to 4.2 micrograms per in.) and then grouping individual bales of cotton, the mill has been able to blend its cotton better and to obtain superior processing results.

Over-all conclusions on fiber fineness arrived at by the mill include: (1) fineness of cotton influences the spinning operation and the quality of yarn produced; (2) by proper fineness measurement and blending, cotton being fed into the mill has the same average fineness from day to day; (3) with fineness controlled, variations in nep count at the card and in the finished product can be reduced; and (4) control of fineness permits the mill to operate its machinery continuously at optimum settings for the fineness grade decided on.—Textile World, Jan, p122

## Lengthens Battery Life

Compound AD-X2, made by Pioneers, Inc., when added to storage-battery electrolyte, prevents sulfation of lead plates. In some cases, life expectancy was increased four times.

AD-X2 is washed gradually into battery cells with water. Engine is started and run for 30 min. New batteries are treated similarly. One application lasts the life of the battery.—Const Meth & Equip, Jan, p117

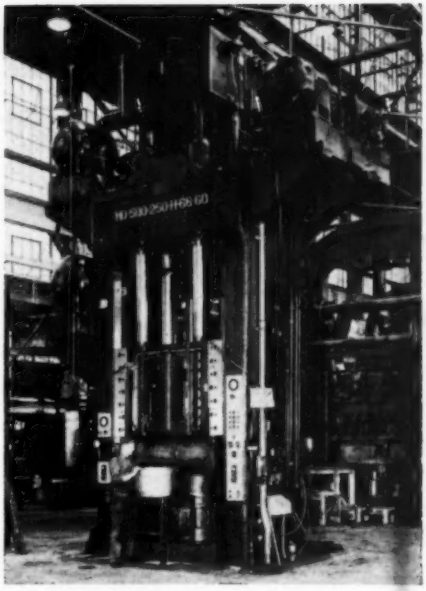
## Glass Furnace Heats Steel

In France, during the war, glass manufacturers developed methods for melting glass by passing an electric current through it. Electrical resistance of the glass provided the necessary heat.

In England, this principle has been applied to create a radiant heat source for annealing strip and for heating ingots and billets. The furnaces are made by Electric Furnace Co., Ltd.

The main source of heat is radiation from the surface of a molten-glass pool contained in two channels on either side of the working hearth for the ingot and billet furnaces and under the strip in the annealing furnace. Power to melt the glass is brought in by graphite electrodes immersed in the glass.

This type of furnace is practical only where power cost is low. Advantages include low refractory costs and electrode use.—Ceramic Ind, Dec. p83



**HUGE PRESS DRAWS WASHER TUBS**

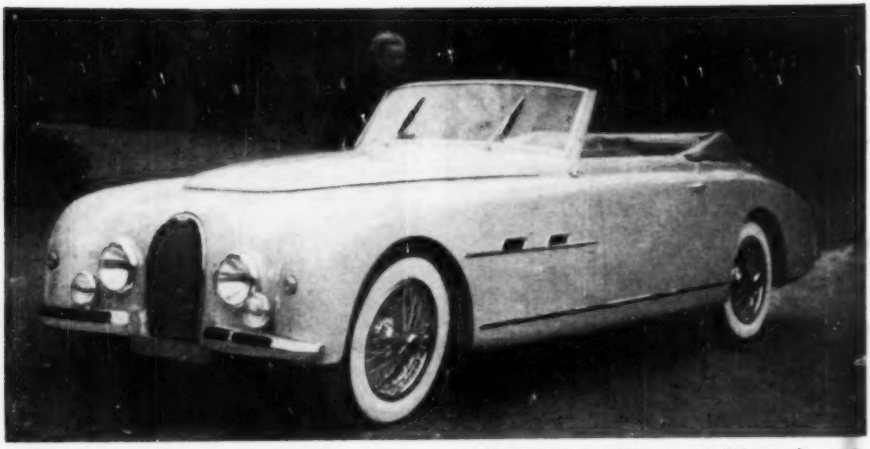
**Double-action hydraulic press draws high-quality washer tubs. Press, made by E. W. Bliss Co., has two drawing speeds plus quick advance speed. Fast draw is made at 250-ton pressure. Full 750-ton capacity is available with press converted to single action.—Am Mach, Jan 7, p186**

# What World's Cars Look Like

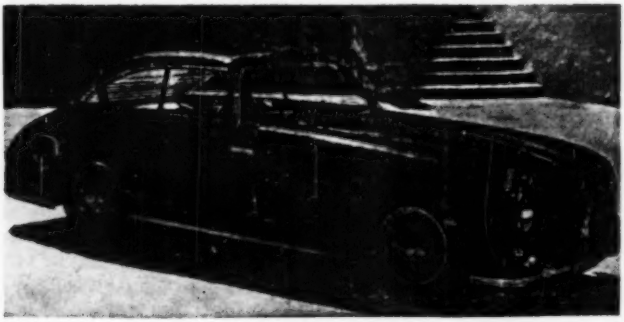
**STUDEBAKER** hardtop convertible features new front-end treatment. Mechanical changes include: better brake action, push-button starting.—Am Auto, Feb, p46

**KAISER-FRAZER ALLSTATE** will be sold by Sears, Roebuck & Co. Car will be offered in standard and deluxe models with choice of two high-compression, L-head engines, a four and a six. Four-cylinder engine delivers 68 hp. and 6-cylinder engine 80 hp. Upholstery is washable plastic.—Auto Ind, Jan 1, p19

**LINCOLN** cars for 1952 have new engines, frames, bodies, and suspensions. Engine is an overhead valve, 160-hp. V8. Compression ratio is 7.5 to 1. A ball-joint front-wheel suspension reduces weight, number of parts, and number of lubrication points; adds stability and improves ride.—Am Auto, Feb, p42

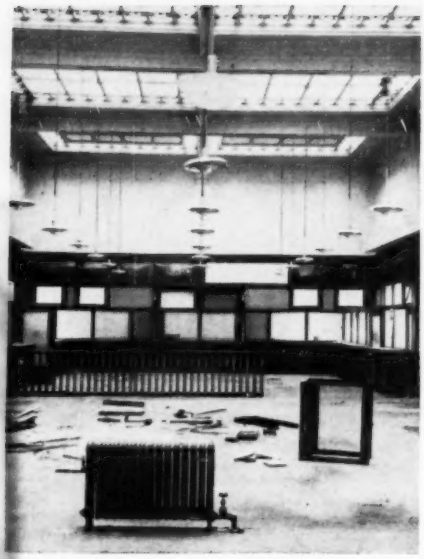


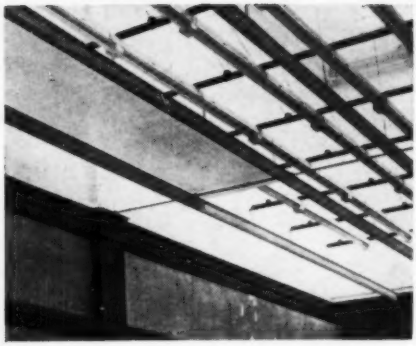
**FRENCH BUGATTI** is powered by a straight-eight engine. With supercharger, engine develops 220 hp. Without it, output is 150 hp.—Am Auto, Dec, p47



**SPANISH PEGASO'S** main features are: (1) light-alloy V8 engine with overhead camshafts; (2) five-speed transmission; (3) De Dion type rear axle; (4) torsion bar suspension, front and rear; and (5) integral body-frame construction. Three compression ratios are offered —7.9, 8.5, and 13.—Am Auto, Dec, p46

**GERMAN GOLIATH** is designed for the low-priced field. Priced at $1,800, the car is a two-door sedan. Engine has two cylinders and is rated at 22 hp. Despite small size of engine, car will do 65 mph. Gasoline economy is good. At average road speeds, the car will go 36 miles per gallon.—Am Auto, Dec, p47





← THIS TO THAT ↑

. . . was the transformation at Bechtel Corp. from a 96x40-ft. room with skylights 25 ft. high to modern well lighted drafting room. Steel framework was erected 13 ft. from floor to take corrugated plastic sheets made by Luminous Ceilings Inc. Above sheets are slimline lamps and acoustical baffles for sound deadening.—Elec West, Dec, p86

## Gasoline Octane Increase Claimed for New Catalyst

A synthetically compounded catalyst, composed of naturally occurring minerals and cast in the cylinder head of an internal combustion engine, was recently described by Associated Development and Research Corp. as promising greatly improved engine performance.

Tests have demonstrated improved performance of gasolines equivalent of up to 25 octane numbers. The catalyst also promotes more complete combustion and inhibits formation of carbon deposits.

The synthetic ore-catalyst reacts on the fuel-air mixture when it enters the combustion chamber, with some properties promoting completeness of combustion while others retard the combustion rate and thus prevent knock. Still other properties take care of particular reactions in gasolines of different specifications.

The life of the catalyst is reported to exceed that of the engine carrying it. No critical ores are contained in the catalyst's makeup. Primary ingredients are silicates and oxides.—Aviation Wk, Jan 21, p67

## New Brilliant Blue Dye

Highly fast dye that produces a brilliant blue on textile fibers has been developed by Bayer Leverkusen, Germany. It is based on the reaction of a phthalic acid derivative with copper sulfate.

The dye, known as Phtalogenbrilliantblau F3G, has its color-producing reaction released by heat or steam. Conditions must be closely controlled to prevent too rapid a reaction, with subsequent cracking of the printing dye.—Chem Wk, Dec 29, p28

## Check Wool Blending With Ultraviolet Light

Better blends are the result of ultraviolet light checks from the picker to the loom. By use of the technique, which involves a small amount of fluorescent dye, Nye-Wait Co., Inc., checks the uniformity of fiber distribution per unit volume in wool blending at different stages of manufacture.

About 1% of a white-wool batch, or some one component, is stock-dyed with a 1% fluorescent dye. This dye is not strong enough to be seen in the final yarn and does not interfere with subsequent dyeing.

In the picker-house bins, after blending, when the stock is viewed under ultraviolet light, large lumps of dyed stock stand out boldly. Study of the lumps and their distribution gives an index of blend uniformity.

By means of the portable lamp, the performance of the stock in the card-hopper bin and during the carding action can be watched. Roping that comes off the breaker card and finisher card will show the degree of uniformity of fiber distribution and will also show up poor carding.

An examination of the filled bobbin from the mule after spinning gives the first criterion on the over-all levelness of the fiber distribution and quality of carding.—Textile World, Jan, p108

## Diamond-Impregnated Bits

Proper sandblasting is important to long life and economical performance from diamond-impregnated coring bits. Insufficient sandblasting will not give the diamonds essential clearance. Result is poor rate of penetration. Excessive sandblasting exposes diamonds too much, may break them.

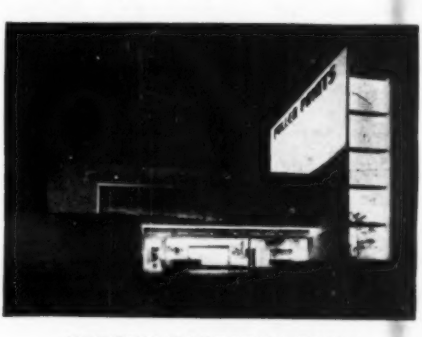
A jig for sandblasting consists of a turntable that rotates the bit at a uniform rate. Matrix is abraded uniformly as the face of the bit travels under the nozzle of the sandblaster to protect the inside diameter surface from the blast, a rubber plug or snug-fitting piece of hose is placed inside the bit.

Silicon-carbide abrasive in the 40–80 mesh-size range performs satisfactorily. An air pressure of 80 psi. through a $\frac{1}{2}$-in. nozzle gives sufficient cutting action over a wide area.—Eng & Min J Dec, p87.

## Reactor Produces Power

U. S. Atomic Energy Commission's Idaho reactor pile, in a trial run in December, produced more than 100 kw. of power as a byproduct of its breeder reactor experiments. Power operated pumps and other station equipment.

Heat energy generated was removed from the reactor by a liquid metal at a temperature high enough to generate steam to drive a turbine. Kind of metal and cost figures were not revealed.—Elec World, Jan 7, p10



MODERN FACTORY FRONT

New Los Angeles plant of W. P. Fuller Paint Co. dramatizes with light its three products—paint, glass, and wallpaper. Floodlighting and backlighting illuminate the central structural pylon, glass-block shaft, and silhouetted entrance sign. Lighting units include incandescent floodlights, 96-in. fluorescent lamps, and cold cathode tubing.—Elec C&M, Dec, p121

# TECHNICAL SHORTS

**Far Traveler**—Radioactive dust from an atomic explosion in Nevada caused Du Pont's photographic paper-coating plant at Rochester, N. Y. (2,000 miles away) to be shut down for 36 hr. Dust was carried to earth by snow and sucked into the ventilating system.—Paper Ind, Dec, p1040

**Glass-bead Paint**—Glass beads have been applied to highway painted lines in the past, but beads were added after paint was applied and before it dried. A paint that already contains glass beads has now been developed.—Ceramic Inc, Dec, p44

**Automotive Bearings** — Nylon bearing blocks for all kinds of engines have been made by a Dutch firm with a new process that lowers their cost. Blocks are turned on lathe from nylon bars. They are claimed to outlast bronze bearings by four to five times.—Am Mach, Nov 26, p105

**Balances Air Conditioning** — Auxiliary electrical heating units at each air outlet balances heat distribution of single-duct system at Lever Brothers Co.'s new soap plant in Los Angeles. Heaters work better than variable louvers or dampers.—Elec World, Dec 3, p148

**Tungsten-carbide Facing**—Hard facing with inert-gas-shielded arc flows tungsten-carbide rod onto metal surfaces. Rod, made experimentally by General Electric Co., deposits facing with 70% tungsten carbide. Wear resistance is 15 to 20 times that of chilled cast iron.—Weld Eng, Dec, p46

**Low-cost Power**—Western Electric Co-operative is getting low-cost power (1.96 mills per kw.-hr.) from three-unit dual-fuel diesel plant. Prime movers are 8-cylinder, 16x22-in., 4-cycle, supercharged Nordberg engines, each rated at 1,685 hp. and driving 1,100-kw., 4,160-v. generator.—Power, Jan, p96

**Landing Craft Is Plastic**—Largest plastic U. S. Navy craft is 36 ft. long and has a one-piece double-hull construction made of fiber glass cloth and polyester resin. The boat is fitted with a steel landing ramp and armor.—Marine Eng, Jan, p44

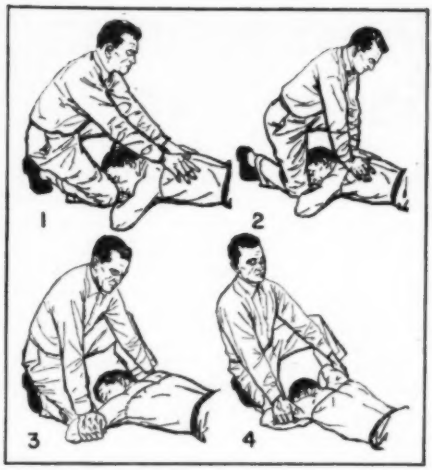
**Coal for Australia**—An Australian-German engineering firm will begin operations to mine 11-million tons of coal in New South Wales. The German firm will import $1-million of mining equipment.—Coal Age, Dec, p168

**Protects TV Antenna**—Outdoor television antennas should be protected from lightning by arresters and grounding. Arrester should be mounted as near to the earth as the receiver for maximum protection.—Elec C&M, Jan, p92

**For Industrial Flooring**—Tests are being made of phenolic laminated wood for industrial flooring. It is more expensive than concrete but so far has shown superior wear characteristics.—Mod Plastics, Jan, p78

TRUCK RIDES ON TWO LEVELS

This hand-truck conveyor runs on a powered chain and has special heavy dogs spaced so that they will engage the axle of a loaded truck. Operator simply pushes truck over the chain, and the dogs, gripping the truck, will pull the truck up to the next level.—Textile World, Dec, p180




ARTIFICIAL RESPIRATION METHOD

**An improved method of artificial respiration—known as the back-pressure armlift—has been adopted in the U. S. Victim is placed face down in a prone position. Rescuer, on his knees, places his hands on victim's back (Fig. 1). Heels of rescuer's hands are just below a line running between victim's armpits. Rescuer (Fig. 2) rocks slowly forward until his arms are vertical. Next (Fig. 3), rescuer rocks slowly backward and slides his hands to victim's arms just above the elbows. Continuing to rock backward (Fig. 4), he raises the arms—then drops them to complete a full cycle. Cycle is repeated 12 times a minute.—Coal Age, Jan, p136**

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**Colored Grease Fittings** — To assure proper lubricant at the proper place, Morrison-Knudsen International Co. paints grease fittings and grease guns matching colors. Different colors indicate different lubricants. Mechanic matches gun to fitting.—Const Meth & Equip, Jan, p118

**Stainless-steel Substitutes** — Vinyl-encased low-carbon steel for bolts and nuts have proved at Industrial Rayon Corp. to be an excellent substitute for stainless steel under highly corrosive conditions. Cost is one-seventh that of stainless steel. —Factory, Jan, p142

**Cleaning Pipe Lines**—Southern Counties Gas Co. in California removes dirt from gas-transmission lines by forcing chain-covered rubber balls through pipe under pressure. Section length usually cleaned is about 5 miles where second opening is previously made.—Oil & Gas J, Jan 7 p63

**List Your Chemicals Here**—Free service offered by International House, New Orleans, is finding foreign chemicals and raw materials for American buyers. Contacts are maintained with over 25,000 foreign firms that want to sell in the U. S.—Chem Wk, Nov 17, p60

**Glass Paper**—U. S. National Bureau of Standards has made a paper composed entirely of glass fibers. Fine glass fibers were mixed with water and formed into sheets on paper-making machine. Uses will include air filters and as insulator and dielectric.—Prod Eng, Jan, p195

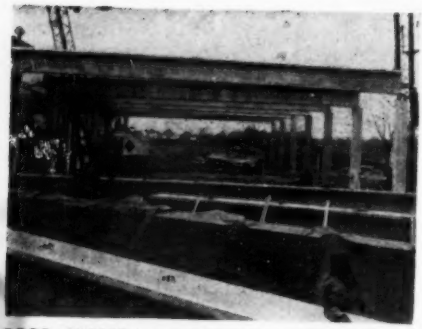
**Fan Stops Cl Freezing**—Sometimes chlorine tanks freeze when chlorine withdrawal is faster than normal. This kink will stop freeze-ups. A fan, placed near the bottom of the tank, blows air over the container and prevents freezing.—Eng News-Rec, Dec 13, p46

**Up Accident Rates**—A survey just released indicates that foremen who tend to be "little dictators" increase the accident rate of their workers. When autocratic foremen were removed, accident rates went sharply downward.—Am Business, Nov, p61

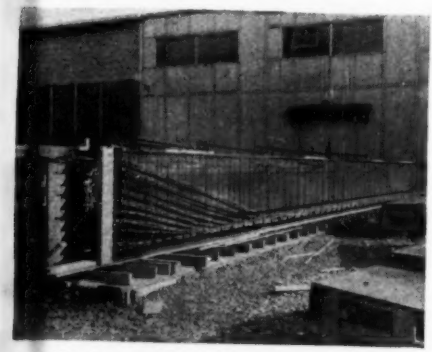
**A Good Time for Maintenance**—When your knitting machines are half disassembled for a style change, why not include a major overhaul? It might avoid cutting into production time later.—Textile World, Jan, p143

**More Cars for Australia**—The Rootes Group of England—makers of Hillman, Humber, Sunbeam-Talbot—is planning to manufacture automobiles and trucks in Melbourne. Chrysler Corp. also will start full assembly of cars and trucks in Australia.—Mach, Dec 15, p1924

# Prestressing Saves Steel



*ROOF GIRDERS spanning 60 ft. in a factory addition were precast and prestressed.*



*CABLES for applying the prestress were placed in the forms before concreting.*

*JACK stretched the 3-wire cables. Wires have button heads at ends.*

THE STEEL SHORTAGE has caused the Austin Co., engineers and builders, to try prestressed concrete. As a result, the firm says it needs less than one-third the steel required for ordinary steel framing for the 60-ft. prestressed girders in a building they are now erecting.

First industrial application is to roof girders in a one-story, 60 x 140-ft. plant addition. Supported on precast reinforced concrete columns at 20-ft. intervals, the girders carry steel purlins and a wood roof.

The 60-ft. members were precast and prestressed on the site. Made of 5,000-psi. concrete, they are I-shaped in section, and 40 in. deep. The top flange is 30 in. wide and 6 in. thick; the web is 6 in. thick, and the bottom flange is 12 in. wide and 3 in. thick. Each girder weighs about 12½ tons.

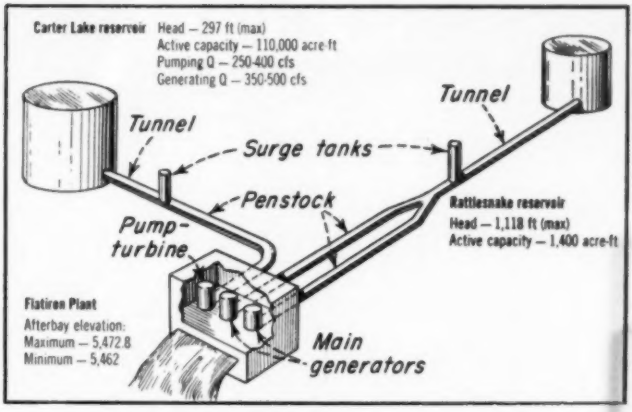
Cast in plywood forms, the girders were prestressed a week later, after the concrete had attained sufficient strength. A 60-ton center-hole hydraulic jack acting against the end of a member applied a stress of 145,000 psi. to each of 60 strands of ¼-in. dia. wire encased in it. With allowance for shrinkage and plastic flow, working stress was assumed by the designers to be 123,000 psi.

Wires were grouped in 10 double cables of three wires each. They were coated with an asphaltic material and waterproof paper to prevent bond with the concrete. A button head was pressed on each wire end for anchorage purposes.

Stirrups align the cables and supplementary reinforcing bars.—Eng News-Rec, Jan 3, p28

**PUMPED-STORAGE IRRIGATION UNIT**

**Flatiron Power and Pumping Plant, now being built in Colorado, is part of a project to carry irrigation water through Continental Divide. Unit will provide seasonal cycle of pumping during winter and power generation during summer irrigation. Pump-turbine will act as turbine or pump, along with reversible generator - motor. — Elec World, Jan 7, p34**




## Mix Highway Concrete Right on the Subgrade

In Norway, concrete highways are built by dumping a sand-cement mortar on the prepared subgrade, then kneading the coarse aggregate into it. Called the Holten system, it requires special construction equipment and makes no provision for slab reinforcement.

Pavement is laid within standard steel road forms on which paving machines ride. Equipment includes, from front to rear: (1) a mortar spreader, (2) a loading crane, (3) a stone spreader, (4) two sheepsfoot rollers, (5) a smooth roller, and (6) three tampers.

As machines advance along forms, a layer of mortar is distributed evenly on the subgrade and stone or gravel is put down on the mortar. When materials have been deposited, they are subjected to kneading action of two sheepsfoot rollers. The rollers press the coarse aggregate into the mortar, which in turn works upward. Next, the concrete slab is compressed with a heavy smooth roller.

Slab construction is completed with three tampers—two working diagonally and one transversely. Surface finish is applied by a smoothing templet that works sidewards along with the last tamper.—Const Meth & Equip, Jan, p66

## Jet Bits for Power Rigs

Most prevalent wrong idea about jet-bit oil-well drilling is that only steam rigs can use jet bits because of the high mud pressures required. But at present, some of the most successful applications are on power rigs.

Also, correct mud volume, not pressure, is the basic requirement of jet bits. Maintaining the volume usually requires not over 200 psi more pressure than in conventional drilling. Some drillers have changed drill-pipe size and use jet bits with even less pressure than needed for conventional drillings.

Minimum volume of mud for the average hole is equivalent to an annulus velocity of 175 ft. per min. Greater volumes give better results with jet bits.

Jet-bit velocities should be kept well above 200 ft. per sec., preferably about 250 ft. per sec. but, of course, within limits.—Oil & Gas J, Nov 15, p136

# DOW caustic soda

## for your processing needs

In every industry where caustic soda is used—soap, paper, chemicals, textiles, petroleum, metal, and many others—Dow is a leading supplier of this *workhorse* chemical. And there's a reason. Process men know every shipment of caustic will meet the high standards of quality that Dow has maintained for over fifty years. Dow caustic is produced for export markets in solid and flake forms. There's a Dow Sales Representative near you. Contact him for information about these products and more than 600 other chemicals which

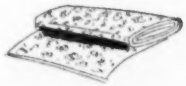
# fill your chemical requirements from these Dow products

**plastics** Styron (Dow polystyrene) is a thermoplastic material used by manufacturers to cut production costs and bring added sales appeal to such items as electric refrigerators, camera cases, and automotive interior parts. Other Dow plastics include: Ethocel (Dow ethylcellulose) a tough plastic with excellent shock resistance; Saran for extruding and weaving into seat covers and screens; Saran film for packaging.

**glycols** These versatile Dow chemicals are in great demand in many industries. Here are a few of the jobs they are doing: a moistening agent in foods and tobacco; a plasticizer for films; a freezing point depressant in automotive and industrial antifreezes; a solvent and carrier in printing inks; a coupling agent in textile soaps, as well as in various cosmetic preparations. More details about Dow glycols on request.

**solvents** Dow is a source of many types of solvents. Dow chlorinated solvents are regularly used in industry to dissolve oils, fats, waxes, gums, resins and other materials. In industrial cleaning and formulating products such as paint removers, they bring fast action and are nonflammable. Check this list of other Dow solvents: Dowanol glycol ethers, polyglycols, and alkanolamines.

**dowicide products** Manufacturing processes today can be guarded against attacks of mold and bacteria by the use of Dowicide industrial germicides and fungicides. These products protect materials against micro-organism attacks in processing paper, textiles, leather, lumber, adhesives, petroleum and disinfectants. They are produced in both oil and water-soluble types.



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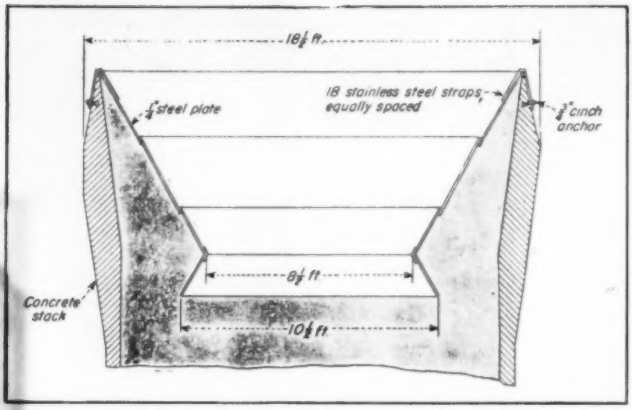



**NOZZLE RAISES STACK VELOCITY**

**Internal steel nozzles for power-station smoke stacks triple discharge velocity. Three installations, made in place of rebuilding 45 ft. of each stack, will save $30,000 for Wisconsin Electric Power Co. Also, it will avoid 31 outage days for each 80,000-kw. unit. Nozzles will prevent down-travel of gases.—Elec World, Nov 19, p128**

## 300-Ft. Pipe Is Lowered by Bolts to River Bed

The job was to install a 544-ft. run of pipe in a trench 30 ft. below the river surface. Pipe diameter was 5 ft., 4 in. and the pipe was completely encased in concrete. Floating derricks were not available. So Merritt-Chapman & Scott Corp. went about it this way:

After it was decided to install the pipe in two sections, each nearly 300 ft. long, a trench was dredged across the river. Starting at one end, two lines of H-piles were driven out to the middle of the stream, one line on each side of the trench. Each pair of piles was capped 17 ft. above the water surface with a horizontal member, forming an inverted U-frame. Two working platforms were erected, one 3 ft. above the water surface, the other atop the bents.

Sections of pipe were skidded out on the lower platform and welded end to end. Next a wire-rope sling was passed under the pipe at each bent and fastened to the bottom of a threaded rod. Each rod passed up through a bent cap where it engaged a bearing nut. Wrenches were provided for each nut for lifting or raising.

Half the pipe was encased in concrete, then lowered into the water by the rods. Buoyancy supported about one-third of the pipe's weight, thus reducing the strain on the whole setup. The second half of the pipe was then encased in concrete.

Next came the lowering operation. Two men manned each wrench and, at a synchronized signal from control men, took two complete turns. Lowering took place at the rate of 1 ft. per hr.—Const Meth & Equip, Dec, p46

## Plastic Duct Systems

Plastics are turning out to be the preferred materials for many industrial applications. Plastic ducting systems and tanks for chemical plants are examples of this trend.

Mechanical Goods Div., U. S. Rubber Co., makes tanks, lines, trays, hoppers, feeders, fume exhaust hoods, collectors, washers, stocks, fume troughs, and gutters. The equipment is "all plastic." No other material is used in construction.

Reinforcing ribs and joint and corner

strips are extruded from a styrene-nitrile rubber copolymer. Sheets of the same material form sides, tops, and bottoms of the ducts. Rivets and bolts are made from extruded rod stock.

Advantages are: (1) cheapness compared with stainless steel, (2) durability compared with galvanized metal or wood, (3) lightweight and ease of installation, and (4) excellent resistance to chemicals—Mod Plastics, Dec, p97

## Product Design Shorts

• Glass cloth treated with silicone rubber is highly effective as motor and cable insulation. General Electric Co. is making it in 36-in. widths and 4- to 10-mil thicknesses.

• About 150 foundries in the U. S. and abroad are making castings of ductile, or nodular, iron. More than 75 different types of castings, ranging from less than 1 oz. to more than 40 tons, are reported.

• Automobile makers may turn to wiring harnesses of aluminum wire. Special supports may be needed to prevent aluminum conductors from fatigue failure.—Prod Eng, Jan, p5

## Concrete Piles Precast without Reinforcing Steel

New steel saving plan has been tested by Ben C. Gerwick, Inc. It involved casting, handling, and driving precast concrete piles, then removing the longitudinal reinforcing steel for reuse.

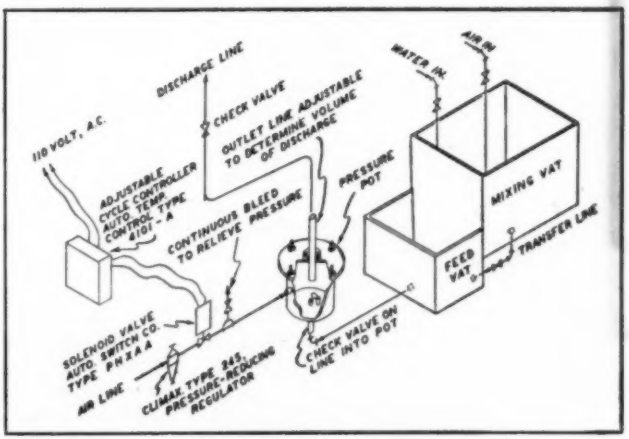
In many structures, pile loading is axial with no significant bending stress. In such cases, longitudinal reinforcing steel may be needed in precast piles only to take handling and driving stresses. So, in the tests, reinforcing steel was arranged so it could be removed after the pile was in place.

Longitudinal reinforcing consisted of one or more threaded steel rods that fitted loosely in paper tube sleeves cast in the concrete. The rods were anchored top and bottom with nuts and washers. After the concrete had attained required strength, the rods were tensioned to a specified unit stress to prestress the pile for handling and driving.

After driving, upper nuts were removed. The rods were unscrewed from the lower nuts and pulled out of the pile.—Eng News-Rec, Jan 10, p44

### AUTOMATIC UNIT FEEDS CHEMICALS

Simple, adjustable, and trouble-free chemical feeder, developed at Midland Gasoline Co., has proved practical in 6 years of water treating. Mixing vat holds week's supply of solution, which is fed to pressure pot by gravity. At selected intervals, air pressure forces solution through discharge line into water being treated. Time-cycle controller regulates air to pot.—Oil & Gas J, Jan 7, p64



**AIRPLANE GETS LIFT THROUGH CHANNEL WING**

Custer Channel Wing aircraft was recently tested in tethered flight. Channel-wing principle requires a half-shroud of airfoil section in place of the normal lifting surface. Engine and propeller are placed on the centerline of this shroud with propeller at trailing edge of airfoil section. Propeller then acts as an ejector and draws air through shroud. Velocity of air over upper surface of the shroud reduces static pressure there and produces a pressure differential on the section. This pressure differential makes itself felt as lift regardless of whether or not the channel-wing aircraft has any forward motion.—Aviation Wk, Dec 17, p17

## How To Save or Salvage Hard-to-Get Materials

International Harvester Co. has had a materials saving and salvaging program for many years. At first the idea was to economize, but now the firm has to make the most of the material available. Its program looks like this:

1. Sheet metal scrap is studied to see if it can be made into smaller parts.
2. Carbide tips are salvaged from worn-out or broken tools. Scrap carbide brings a good price.
3. Scale from forging operations is collected. As much as 3,400 tons a year from one plant is collected.
4. New and used perishable tools are interchanged between plants. In four years, $297,000 were saved.
5. Wire instead of flat bands are used wherever possible. This saves 15% steel.
6. Lumber that enters the plant is salvaged. It is just as good as new lumber.
7. Some products allow handling in unit loads without pallets. This saves shipping costs and materials.
8. Sheathed crates are replaced with wirebound crates wherever possible. And, in some cases, crating is eliminated entirely.—Factory, Jan, p116

## Use Odd Yarns In Selvage

A fancy-goods mill can throw away profits if it sells its left-over yarns of a color that has been discontinued. Usually these yarns bring only a fraction of the cost put into them, and the records kept on them take up valuable time.

In spite of all precautions most mills have small lots of varying amounts and colors. Seaboard Mills uses up practically all of these odd lots of yarn as selvage markers.

Each order is noted with the yarn that was used as the selvage marker in that slashing. Thus Seaboard has a permanent record of the time the fabric was slashed and woven and on what looms.—Textile World, Dec, p120

# World Oil Production Rises

**Last year newspapers everywhere were full of dire predictions about the loss of Iranian oil. But world output rose by 12% over 1950**

FROM THE JUNGLES of Sumatra to the street corners of Times Square and Piccadilly Circus, oil is a measure of the world's industrialization. Petroleum production, demand, and reserves take that measure. Here are the data for 1951:

• **Production**—Despite the disappearance of Iran from the ranks of major world producing areas, crude-oil output in 1951 rose to an all-time high. It gained 12% over 1950.

The world daily output averaged 11,700,000 bbl., compared to 10,437,200 bbl. in 1950. U. S. production averaged about 6,143,000 bbl. daily—also a new record and a 740,000-bbl., or 13.7%, increase. Output outside the U. S. gained 10.4%.

The U. S. gain reversed a trend evident since 1946, that is, foreign output gaining more than U. S. output. The most important reason was replacement of the Iranian deficit. The result was that the U. S. share of total production rose slightly—from 51.9% in 1950 to 52.5% in 1951; in 1940, the U. S. share was 62.9%.

Significant developments in foreign production included Arabian American Oil Co. with its Saudi Arabian concession passing Creole Petroleum Corp. in Venezuela as the world's greatest producing company. Saudi Arabia with a 39% gain over 1950 and Kuwait with 53.5% picked up a large part of the production dropped by Iran. Both these operations were producing to the limit of their oil-handling facilities.

By the middle of this year, producing capacity in the Middle East should be 2,400,000 bbl. daily without Iran. This estimate assumes more oil will have to come from Kuwait, Saudi Arabia, Iraq, and Qatar.

Most remarkable production gain in 1951 was shown by Canada—71% over 1950 to a daily average of 134,000 bbl. Venezuela also showed a substantial gain of 13.5% and is now considered to be virtually at its peak capacity. Other area gains: Colombia, 12.6%; Mexico, 6.3%; British Borneo, 25%; Indonesia, 5%; Russia and Eastern Europe, 5.1%.

• **Demand**—World demand for 1951 reached a top record figure of about 10,928,000 bbl. per day, excluding Russia and satellites. This is an increase of 9.2% over 1950. U. S. demand is about 6,970,000 bbl., an increase of 7.3% over the preceding year.

Demand will rise during the next 5 years but not so fast as it did last year. It should go to slightly over 13-million bbl. per day by 1956. Demand will be about 8-million bbl. in the U. S. and 5-million in the rest of the world. Estimated production against this demand is 14-million bbl. daily by 1956.

• **Reserves**—Available information indicates world reserves of crude oil exceed 102-billion bbl.—a 25-year supply at current production rates. Substantial additions have been made to reserves over the last year, particularly in Canada, Venezuela, Colombia, and the Middle East.

The Middle East is the world's greatest oil reservoir. Its reserves are 51-billion bbl. Reserves of other area are: U. S., 26-billion; rest of North America, 3-billion; South America, 11.3-billion; Europe, 350-million; Africa, 175-million; Far East, 1.98-billion; Russia and Eastern Europe, 8-billion.—Oil & Gas J, Dec 20, p224, 229, 270

**LAYOUT MAKES WIRING EASIER**

**Planned placement of materials and tools speeds assembly-line wiring at Sperry Gyroscope Co. Wires are placed in rack in order of use—from left to right in each row—so operator can assemble them rapidly. Spring holds wires out of way after they are ready for soldering.—Electronics, Dec, p138**

## New Chemical Restores Soil to Productivity in Hours

Synthetic organic chemical that converts non-productive soil into productive soil in a matter of hours, instead of the usual years with compost, peat moss, and manures, has been announced by Monsanto Chemical Co.

The chemical, called Krilium (rhymes with trillium), is sodium polyacrylate. It is not a fertilizer. Instead, it is a soil conditioner that by stabilizing soil aggretates against the dispersing or slaking action of water:

- Increases aeration of plant roots, essential in plant feeding.
- Allows more rapid absorption of moisture, thereby cutting down run-off and storing water in the subsoil.
- Reduces loss of water from soil by evaporation.
- Improves workability of soil.

Prospective markets are home gardens, greenhouses, truck farms, areas with badly crusted or saline soils, and for erosion control. Only a small percentage is added to the soil. Tests indicate that Krilium has no toxic effects on soil microorganisms and that it resists breakdown.

Only experimental amounts are expected to be available this year. Initial test marketing may take place late in the year.—Chem Wk, Jan 5, p31

## New Plywood Sandwich

The Douglas Fir Plywood Assn. combines plywood with hardboard and comes up with a new product that has properties that neither material has alone. Called Plyron, it has a core of 3-ply plywood sandwiched between hardboard surfaces. Plywood supplies the strength; hardboard furnishes a surface that is easy to finish and to paint.

Expected applications include:

**Houses**—Biggest use will be exterior siding and subflooring.

**Factories**—Shelving, chutes, bins, table tops are some of the possibilities.

**Vehicles**—Plyron could line railroad cars and form the floor of buses and trucks.—Business Wk, Dec 8, p128

## Chemicals From Coal

A large pilot plant for partial conversion of coal, employing a newly developed low-temperature carbonization process, will be built for Pittsburgh Consolidation Coal Co. Operation of the plant will provide this information: (1) cost and design data for a commercial plant and (2) commercial evaluation of chemicals and special carbons obtained.

Partially converted, each ton of coal produces 0.7 ton of high-Btu. solid fuel called "char", about 37 to 40 gal. of tar liquid, and some gas. The char serves as a high-grade boiler fuel, and the liquid yields low-boiling tar acids, creosotes, or feed stock for making carbon black.—Coal Age, Jan, p136

## Submerged-Arc Welding Applies Two Rods to Job

New method has been devised by Union Carbide & Carbon Corp. to use three-phase power in submerged-arc welding. Two rods are positioned in tandem over the seam to be welded.

Each rod is driven independently. One power lead is connected to one rod, second lead to the other rod, and third lead to ground. Rod tips are close together so they are in common pool of fused material.

The tandem procedure has been applied to welding of high-pressure, large-diameter gas and oil transmission pipe. Welding speeds run to 100 in. per min. on ¼- to ⅜-in. steel plate; this speed is three to four times faster than for single-rod welding.

Both longitudinal and girth joints of pressure vessels larger than 54 in. in dia. can be tandem-welded. The method can also be applied to multipass welds. The advantage here is that metal deposit rate is greatly increased. Speeds of 30 to 50 in. per min. are possible without encountering cracking or poor bead shapes.

Other advantages: flexibility in control of weld quality, improved energy utilization, maximum control of arc blow.—Weld Eng, Jan, p43

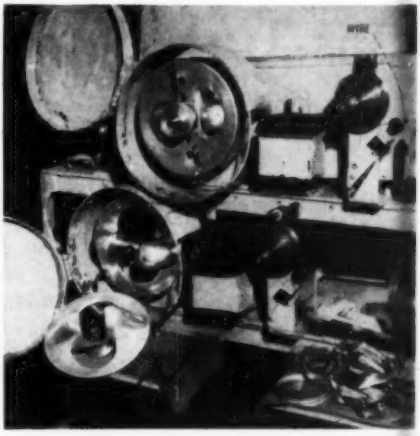
## Hydraulic Steering Gear

A new type hydraulic steering gear has been adopted as optional equipment on a number of 1952 passenger cars. It is designed and built by Saginaw Steering Gear Div., General Motors Corp.

From a design standpoint, the Saginaw steering gear is basically the same as the passenger-car recirculating ball-type mechanism with the addition of a hydraulic booster linked to the pitman shaft through an added power rack. Designed to reduce steering effort but not lose the desirable effect of "feel", the power element does not come into play under light steering conditions. On current passenger cars, the manual effort is held within 3 to 4 lb. while maximum effort with power is held to 7 to 9 lb.—Auto Ind, Jan 15, p51

## Lancing Sulfur from Steel

Quick method to reduce sulfur content in electric-furnace steel is in use at Quebec Iron & Titanium Corp., Canada. A steel lance is inserted into the molten metal, and nitrogen, carrying processed lime, is run through the lance. Injections of slag-forming lime continue until sulfur is at the desired level. Nitrogen is paid for by reductions in furnace time, power, labor.—Iron Age, Jan 3, p213



MACHINE WINDS COILS TO SHAPE

**Specially developed machine winds two shaped coils at a time for deflection yoke of Crosley television receiver. Wire feeds through guide rolls, over sponge soaked with solvent to make plastic coating tacky, and onto mandrel. Each mandrel winds one coil to approximate curved shape. Wire is thrown back and forth to follow contours of mandrel knobs. Machine speed is 1,600 rpm.—Am Mach, Dec 24, p120**

*BOEING GAS TURBINE driving this 68,000-lb. gross weight Kenworth truck-trailer is 175-hp., two-shaft unit that weighs only 185 lb. It has 550 hr. of engine time to drive the truck for 15,000 miles.*

# Gas-Turbine Progress Rapid

**How are gas turbines doing in the U. S.? They are doing plenty undreamed of 10 years ago—driving trucks, even burning wood**

DO YOU REMEMBER the predictions just a couple of years ago that gas turbines would be suitable for only a few applications and then in limited-size ranges? As usual, the researchers fooled the seers and present activity indicates that they will continue to try to apply gas-turbine plants to a wide variety of power needs (McG-H Digest, June '49, p53; Nov '50, p47).

Experimental turbines have crossed the ocean, driven a passenger car, powered a truck, flown airplanes, liquefied air, and buckled down to other chores. And commercial turbines have driven central-station generators, locomotives, gas-transmission line compressors, air compressors for oil and steelmaking processes, superchargers for reciprocating engines, aircraft refrigerating units, water pumps, and other miscellaneous units.

Research has made the gas turbine a versatile fuel user. Natural gas is ideal, distillate oils can be readily burned, residual oils may be used, pulverized coal looks promising, peat and producer gas are under investigation, and even wood may prove commercially feasible.

• **Gas Transmission**—Since May 1949, a Westinghouse 1,800-hp. gas turbine has been driving centrifugal gas compressors, first on a gas line and later for "packing" an underground storage field.

Advantages include: (1) light foundation needs, (2) small station housing, (3) few auxiliaries, (4) low auxiliary-power demand, (5) low lubricating-oil consumption, (6) no water needs, (7) simple piping, (8) no gas-line pressure

pulsations, and (9) ready adaptation to automatic operation.

Westinghouse Electric Corp. is now building a 5,000-hp., two-shaft turbine with generator. An extended surface generator will recover about 75% of available exhaust-gas heat. Another type of 5,000-hp. pipeline compressor drive is being built by General Electric Co. It can be used with or without a regenerator; with heat recovery, thermal efficiency at output coupling will be 22.5%.

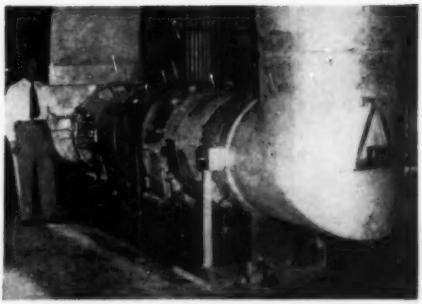
• **Central Station Units**—First commercial gas-turbine installation at Oklahoma Gas & Electric Co. (McG-H Digest, Nov '48, p24) has given good service. This General Electric 3,500-kw. unit has run 18,000 hours on natural gas.

Other units operating are at Central Maine Power Co., Bangor Hydroelectric Co., Public Service Co. of Oklahoma, and Central Vermont Public Service Corp. All these gas turbines are General Electric units. Connecticut Electric Light & Power Co. has four G. E. 5,000-kw units on order. Public Service of Oklahoma has ordered for 1954 delivery a Westinghouse 15,000-kw. gas turbine—largest so far in the U. S.

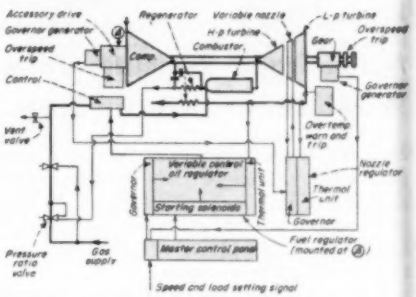
• **Auxiliary Drives**—Last year Solar Aircraft Co. delivered a single-shaft 250-kw. gas turbine that is considered ideal for shipboard emergency generator drive. The turbine in its present form can drive pumps, compressors, blowers. It accelerates from start to full speed in 17 sec. Adding a third stage on a separate wheel would make the unit suitable for vehicle and small-boat propulsion and other variable-speed applications.

Another Solar development is a small gas-turbine-driven pump (McG-H Digest, Feb, p29). It is hand-started, burns diesel fuel.

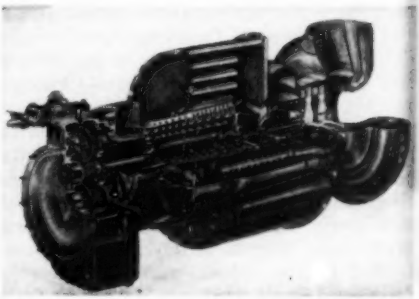
• **Truck Drive**—The Boeing Airplane Co. 175-hp. gas turbine (McG-H Digest, Mar '50, p27; Aug '50, p55) has driven



***WESTINGHOUSE** 1,800-hp. gas turbine was first applied to gas pipeline pumping. Compressor is located on other side of fire wall.*




***GENERAL ELECTRIC** is building 5,000-hp. pipeline gas turbine. Control system shown makes station completely automatic.*



***SOLAR** 250-kw. gas turbine for shipboard use burns diesel fuel, has low weight and space needs, is relatively easy to maintain.*

a 10-ton truck and trailer for over 15,000 miles in road trials.

Fuel consumption is about 1 to 1.2 miles per gal. Boeing believes this can be cut by reducing drive line and transmission losses, redesigning truck to save weight, and raising engine thermal efficiency.

• **Wood-burning Turbine** — Oregon State College has built a 200-hp. gas turbine that burns 600 lb. per hr. of mill waste sawdust with moisture as high as 55%. Wood is burned under pressure, and combustion products pass directly through the turbine. Pilot plant to be completed in 2 years will be given a 6-month test run in a sawmill.—Power, Jan, p71

## Multi-Stage Pressure Units Wash Brown Kraft Stock

Expansion and modernization of Chesapeake Corp.'s paper mill have put some new ideas into practice. One such idea is substitution of pressure washing of kraft pulp in place of diffusers and rotary vacuum washers.

Two lines of Sutherland pressure washers provide multi-stage washing of brown stock. Each washer has a worm with trough area diminishing uniformly toward the discharge point while flanged diameter remains constant.

The worm is so designed that the pulp does not rotate but moves in a straight line along the trough. A definite volume ratio between feed and discharge controls the pressure within desired limits.

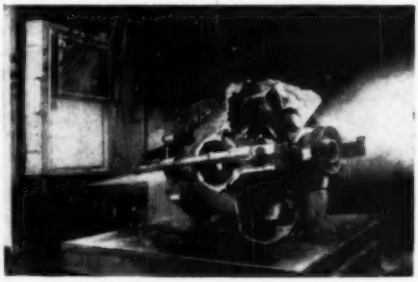
Stock at 11% consistency is chute-fed to the first press, along with some filtrate from the second press. Stock discharge at 37% consistency along with some filtrate from the third press is fed to the second press. This cycle continues until final washed stock from the fourth press is conveyed to the high-density storage tank.—Paper Ind, Dec, p1062

## Radioactive Tracers Speed Tool-Wear Measurement

Cutting-tool wear can now be measured accurately and rapidly with radioactive tracers. The tool is made radioactive by neutron irradiation in a nuclear reactor. The radioactivity of collected particles worn from the tool in a few seconds indicates the wear.

In the investigation, made at Cincinnati Milling Machine Co., cutting-tool material was sintered carbide of tungsten, titanium and tantalum carbides with cobalt. After irradiation, tracer radioisotopes were W185, Ta182, and Co60.

After cuts were made, a Geiger counter indicated radioactivity of chips. Radioactivity was plotted against tool wear as measured by a microscope on the flank of the tool. Correlation of results were found to be excellent, showing that the method is well suited to rapid determination of relative values of tool wear and tool life.—Am Mach, Dec 24, p100



**CAB FOR SAND BLASTER**

**Air-conditioned, monorail-mounted cab for the operator has tripled production in the hydraulic sand blaster at Falk Corp. Cab eliminates heavy rubber clothing and air hose previously worn by the operator. Cab moves around three sides of the room on the monorail track, also up and down. Mobility of cab, plus rotating gun on a turret-type mounting, completely covers work.—Factory, Jan, p113**

## Station Control Centers Need Modern Lighting

Lighting of power-plant control rooms, dispatching centers, and system analyzer rooms must meet certain visual tasks and requirements. Major ones are:

1. Vertical illumination on instrument boards and maps should be great enough for quick but comfortable visibility. It should not be so high as to make it hard to see indicating lights or the light-beam galvanometer. It should be reasonably diffused to avoid shadows, especially on instrument scales.

2. Light sources must not present themselves as images of specular or veiling glare in instruments' glass faces or as brightness areas in competition with object observed.

3. Horizontal illumination should be reasonably diffused. Light source or any secondary reflecting surface should cause no glare from the horizontal plane.

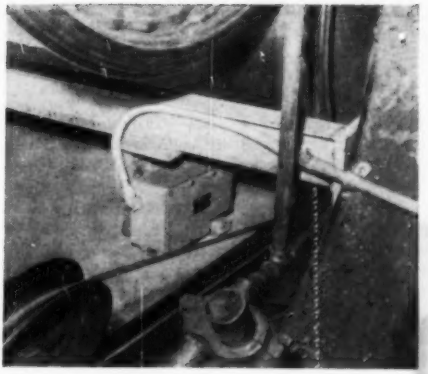
4. Brightness contrasts between various surfaces should cause no visual discomfort.—Elec World, Dec 17, p97

## No-Sting Iodine Solution

Iodine germicide that does not sting the skin is now available from General Aniline and Film Corp. The product, called Antarate AV441, is a combination of iodine and a carrier.

The carrier is a nonionic agent. The iodine has little or no effect on the skin, producing comparatively little irritation. Reactivity as a germicide is greater than equivalent solutions of iodine in alcohol or potassium iodide.

Applications for this type of iodine solution will be as a skin germicide in hospital, restaurant, and dairy sanitation; and in unexplored possibilities in the field of medicine.—Chem Wk, Dec 22, p19



**PAPER-TENSION CONTROL**

**Accurate tension control on paperboard machines at Ohio Boxboard Co. is provided by General Electric tensiometers. These instruments, installed between last two dryers, actually feel tension of board and emit signal to control motor speed and therefore hold sheet tension constant. Sensing element of tensiometer is roller pressed lightly against moving sheet. Roller displacement changes air gap of magnetic assembly and causes electric signal.—Paper Ind, Dec, p1057**

## Roof Coating Protects

Special paint provides real protection against roof falls caused by atmospheric changes in the Foster No. 5 mine, Edman, Pa. Painting cost is 1% of former cost of loading out rock and retimbering.

"Rufkote", made by Joseph Woodwell Co., provides the heavy-base coating that is needed. The same type of spray gun for undercoating automobiles applies the coating.

Coating must be done when the roof is dry. All loose particles of rock are taken down. And all dust should be removed from the roof. A high-pressure rockduster sprays wet areas with dry portland cement. This cement hardens on the rock, saving the labor of sweeping off the dust.—Coal Age, Dec, p88

# NEW EQUIPMENT...

**Surface Active Agents**—Three dialkyl sulfosuccinates, offered in trial-lot quantities, have good emulsifying properties for stabilizing oil-in-water systems. Possible uses: perfumes, dyeing, wet finishing of textiles, paper products, insecticides.—**American Cyanamid Co.**—Chem Eng, Jan, p200

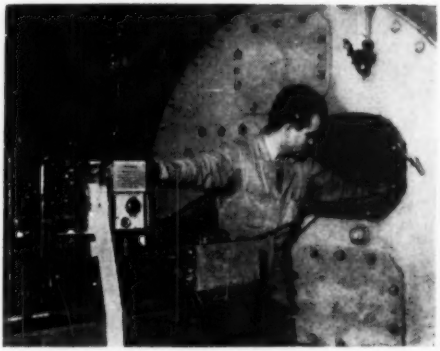
**Gang Nut Fastener**—New gang channel multiple nut fastener speeds aircraft assembly by eliminating standard anchor nuts; channel is made of 24ST aluminum. Inserts are spring-steel self-locking nuts.—**Kaynor Mfg. Co., Inc.**—Aviation Wk, Jan 21, p55

**For Water Troubles**—Regular use of Micromet, a slowly soluble food-grade phosphate, in Micromet Feeder overcomes lime scale, corrosion, and "red water." Unit is for homes with jet pump, or shallow-well water system.—**Calgon, Inc.**—Am Builder, Jan, p166

**Better Flooring**—Worn, cracked, rutted floors of concrete, wood, asphalt, or composition materials can be repaired with Roc-Wood. It consists of hardwood fibers bonded with a plastic and is applied by trowel.—**Roc-Wood Flooring**—Iron Age, Jan 3, p504

**Cyclone Plus Centrifuge**—New Sentriclone classifier has operating characteristics of cyclone and centrifuge. It combines independent variation of residence time and velocity of the centrifuge with shearing force of a cyclone.—**Equipment Engineers.**—Eng & Min J, Jan, p122

**Monitors 270 Temperatures**—Electronic scanning system automatically and continuously monitors up to 270 separate processing temperature points. It records only temperatures deviating beyond preset limit. Uses: in power plants and in manufacture of synthetic yarns.—**Minneapolis-Honeywell Regulator Co.**—Electronics, Jan, p144



**HOW TO FIND POOR TUBES**

**This instrument, called the Probolog, inspects nonferrous tubes in power-plant heat exchangers quickly and positively. Probe is electromagnetic pickup unit that is pulled through tube by mechanical puller. Tube condition is shown on chart made by electronic recorder. The Probolog is manufactured by Shell Development Co.—Power, Jan, p94**

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**Contour Saw**—Model V-36-3 contour sawing machine takes continuous saw, file or abrasive bands up to ½ in. wide. Throat is 36 in. Drive motor is 3 hp. Tool speed is 25 to 6,000 ft. per min. Machine has built-in blade welder.—**DoAll Co.**—Am Mach, Dec 24, p162

**Small Tv. Tube**—Industrial television camera tube is only 6 in. long and 1 in. in dia.—one-tenth the size of broadcast tv. camera tubes. Small tube uses new light sensitive material plus other technical advances.—**Radio Corp. of America**—Elec World, Dec 3, p150

**Largest Crawler Shovel**—New 10-cu. yd. unit is designed as a heavy-duty shovel with small machine cycle time. Crawlers increase maneuverability of shovel. Electricity powers unit.—**Marion Power Shovel Co.**—Coal Age, Jan, p116

# . . . AND MATERIALS

**Lightning Arrester**—Model LX De-ion expulsion-type arrester has spiral fiber that lengthens power arc path to four times original spark path, thereby limiting power follow current. Sparkover values are kept low by high field stresses between upper electrode and chamber metal shield.—**Westinghouse Electric Corp.**—Elec World, Dec 31, p107

**Carpet-inspecting Table**—Power-driven inspection and mending table for carpet places the work directly in front of the operator and eliminates the problem of individual handling. Direct time saving is 50%.—**Edward J. McBride Co., Inc.**—Textile World, Dec, p159

**Less Belt Damage**—Belt-conveyor carrier has training rollers that avoid serious belt damage because of improper training. Rollers respond instantly to any belt shift and, by tilting carrier, return belt to dead center.—**Stephens-Adamson Mfg. Co.**—Food Eng, Jan, p113

**Submersible Utility Pump**—Sump pump can be fully submerged in water or other liquids. Pumping starts by rising liquid. Unit pumps within ⅝ in. of bottom, weighs 50 lb., has capacity of 3,300 gph., and needs no special mounting brackets. —**Kenco, Inc.**—Factory, Dec, p150

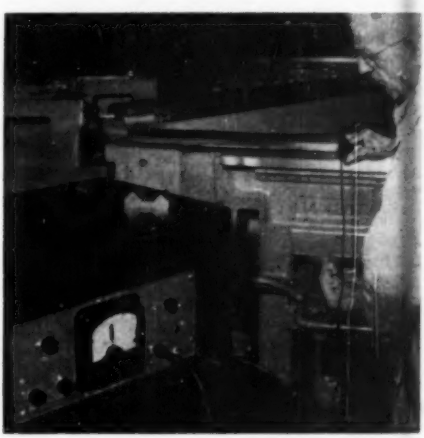
**Provides High Pressures**—Compact high-pressure triplex pump is heavy-duty hydraulic-power generator. Unit is available in 15, 30, and 50 hp. sizes with pressure ratings up to 5,000 psi. and capacities of 60 gal. per min.—**Kobe, Inc.**—Mod Plastics, Jan, p154

**Continuous Mixer**—The Ko-Kneader mixes and kneades materials continuously by a worm blade rotating in a trough. Gaps in blade correspond with teeth in trough to improve mixing action. Available models are for light, medium and heavy duties.—**Baker Perkins, Inc.** —Chem Eng, Jan, p180

**Cleans by Steam**—Fireless Hy-Steam-Pressure Jenny cleans off grease and dirt ten times faster than by hand. It operates on steam from 60 to 150 psi., weighs 240 lb., rolls on wheels, furnishes 45 to 90 gal. per hr.—**Homestead Valve Mfg. Co.**—Power, Jan, p156

**Services Caterpillar Tractors**—Set of caterpillar-tractor service tools for use with the OTC Hydraulic Puller contains minimum assortment of pullers, adaptors, and attachments necessary for servicing caterpillar tractors.—**Owatonna Tool Co.**—Ind Dist. Jan, p132

**Easy Winter Starting**—Ether starting attachments give cold engines a substantial starting punch at the right moment. Ether is stored in steel capsules for safety.—**Caterpillar Tractor Co.**—Eng News-Rec, Dec 27, p72



**COMPARATOR TESTS HARDNESS**

**Hardness of lathe-bed ways is tested on General Electric metals comparator at Hendey Machine Co. Ways are induction-hardened, then compared to master sample calibrated to 70 sceleroscope. Test leaves no mark on metal.—Am Mach, Dec 24, p143**

## NEW EQUIPMENT (Cont.)

**Electrode Saves Copper**—New resistance-welding electrode, trade-named Kaptrode, consists of expendable cap that fits into semi-permanent adapter shank, which in turn fits into standard electrode holder. Copper saved is up to 75%, depending on shank length. Electrodes costs are reduced 20%.—**Fansteel Metallurgical Corp.**—Prod Eng, Dec, p208

**Coiled Aluminum Tube**—Utilitube is coiled tube made of aluminum alloy B50S-O. Uses: fuel and oil lines in engines; fuel lines for heaters; also in air, vacuum and hydraulic lines for brakes and instruments. Corrosion resistance is high.—**Aluminum Co. of America**—Oil & Gas J, Jan 7, p100

**Files Around Curves**—Flexible round abrasive file can file around almost any curve to clean concave surfaces, smooth pipe bends, rasp off inside surfaces of castings. Teeth will not fill on lead, aluminum, or plastic.—**Tec Imports**—Weld Eng, Jan, p62

**Collects Dust**—The Dustbuster is self-contained dust collector for sanders, saws, jointers, planers, other tools. Model JS has 1/3-hp. motor and 633-cfm. fan mounted over 31-gal. dust can. Cleaned air returns to room.—**Aget-Detroit Co.**—Iron Age, Dec 27, p90

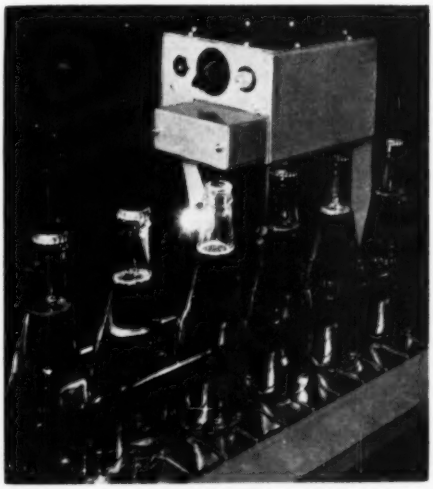
**Protects Chromium Plate** — Corogard forms a colorless protective coating to prevent rusting of chromium-plated automobile trim. It is sold in 8-oz. cans for car owners and in larger sizes for garages.—**Minnesota Mining & Mfg. Co.**—Chem Wk, Jan 12, p35

**For Lace Making**—Vacuum-impregnated process replaces old method of hand separation in lace making. Strip patterns are clipped together with cellulose acetate threads. After processing, rolls are placed in a vacuum tank and impregnated with acetone. Acetone dissolves threads.—**F. J. Stokes Machine Co.**—Textile World, Jan, p170

**Explosion-proof Fitting** — Lighting-fixture fitting, made of cast metal, has swivel joint of 30° swing and free-floating threaded joints. It is explosion-proof. Fitting is self-aligning. Length is 7⅜ in., width 2¾ in.—**Russell & Stoll Co., Inc.**—Elec Whols, Jan, p102

**Cotton Is Fireproofed**—Cotton treated with Pyroset will char but will not flame or smoulder. It retains its flame repellant properties after 25 dry or wet cleanings.—**American Cyanamid Co.**—Business Wk, Jan 12, p53

**Tangent Bender**—New single-wing tangent bender has been designed to shape flanged sheets around fixed radius corners without wrinkling. Bender features automatic positioning of metal to be formed.—**Cyril Bath Co.**—Auto Ind, Jan 15, p56

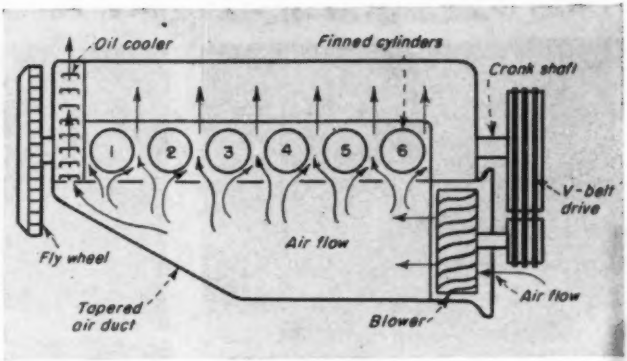


DEVICE DETECTS CAPLESS BOTTLES

Soft-drink, beer, wine, catsup and other bottles can be easily checked during capping by an electronic detector made by W. F. & John Barnes Co. Unit mounted above container line signals if a bottle has no cap and shuts line down after predetermined number of uncapped bottles pass.—Food Eng, Jan, p82

### AIR-COOLED DIESEL ENGINE

Forced air circulation cools diesel engine built by Kloeckner-Humbolt Deutz A. G., Cologne, Germany. Vane-type blower circulates up to 230,000 cu. ft. per hr. over finned cylinders. Advantages claimed over water-cooled engines are reduced weight, better thermal efficiency, simpler engine. —Prod Eng, Jan, p150




**Tubing Resists Corrosion** — Plastic-armored electrical metallic tubing is intended for use in corrosive atmospheres. Vinyl or polyethylene is extruded over standard galvanized tubing. Dielectric properties can be varied.—**Samuel Moore & Co.**—Elec West, Nov, p48

**Packaged Heat Pump**—All electric air-conditioning heat pump, utilizing air-to-air heat transfer, has been announced for homes. It automatically heats, cools, dehumidifies, and ventilates. Available sizes are 3 and 5 hp.—**General Electric Co.**—Elec C&M, Jan, p131

**Remotely Controls Scraper**—Featured in new scraper are cradle action and hydraulic upper-link control. Operator can control scraping angle without dismounting. Bucket is ¾ yd.—**Tractor Sales Corp.**—Const Method & Equip, Jan, p120

**Cleans Air** — Condensifilter removes water, oil, sludge, and other foreign materials from compressed air and so provides dry, clean air for operating instruments. Unit combines dehydrating device, filter, and self-purging trap.—**Hankison Corp.**—Paper Ind, Nov, p978

**Longer Floor Life**—Emery is offered for use as aggregate in making new concrete floors or for resurfacing old floors. Such floors are claimed to withstand loads up to 14,500 psi. without damage.—**Walter Maguire Co.**—Food Eng, Dec, p131

**Roof Ventilator**—Whirlout ventilator, available in wide range of sizes, is open only when fan is running. Air stream holds damper halves open while discharging to outside.—**Swartwout Co.**—Power, Jan, p158

**Airplane Ducts**—Improved flexible ducting withstands extreme temperatures. It can be used in high- and low-pressure systems, is lightweight, resists flames and fumes and temperatures from —70 to 625° F.—**Flexible Tubing Corp.**—Aviation Wk, Jan 7, p59

**Mixes Glass**—New glass batch mixer has batch hopper or feed chute and pneumatic tilting unit. Available sizes are 28, 40, 56, 84, and 112 cu. ft.—**T. L. Smith Co.**—Ceramic Ind, Jan, p194

**Makes Quick Reprints**—Desk-model copying machine makes reprints in seconds. Copy is delivered dry and ready to use, at a rate of 1,000 copies an hr.—**General Aniline & Film Corp.**—Am Business, Dec, p58

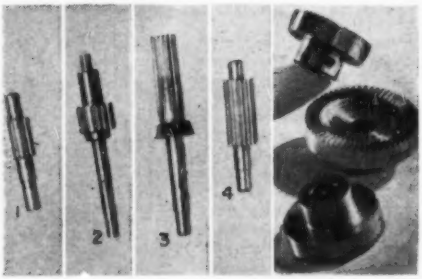
## READER SERVICE

*As a special service to our subscribers, McGraw-Hill Digest will furnish without any charge additional information about any new product or technical development described. Address your letter to: The Editor, McGraw-Hill Digest, 330 West 42nd St., New York 36, N. Y., U. S. A.*

### *This Finger . . .*

. . . shows how small watch and instrument gears can get. Smaller gear has 11 teeth, 180 pitch; larger has 12 teeth, 180 pitch. Tooth length is 0.010 in.

### *Steel Pinions . . .*




. . . are produced one at a time. Examples: No. 1 has 15 teeth, 180 pitch; time is 27 sec. No. 2 has 10 teeth, 85 pitch; time is 7 sec. Crown gears (right) are hobbed.

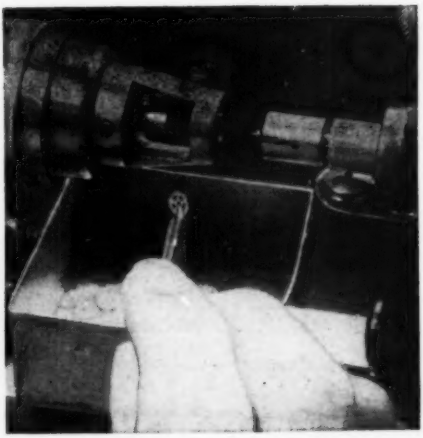
# How To Cut Tiny Gears

**Gears and pinions, nearly too small to see, take some special tricks and techniques. Here's how!—Am Mach, Dec 24, p95**

### *Watch Gears . . .*

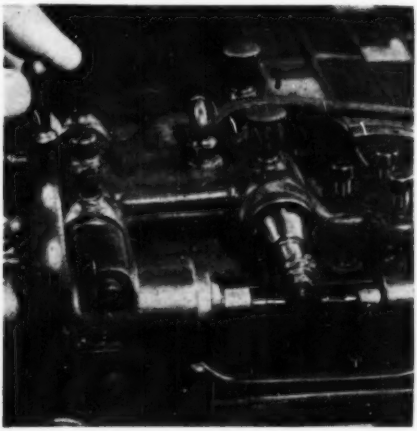
. . . are first blanked, then flattened in simple die. Flattening is necessary as blanks are stacked for hobbing and any distortion could cause irregular teeth.

### *Pivot Holes . . .*



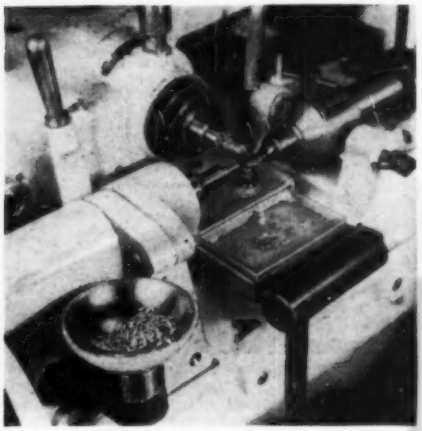
. . . are drilled on this horizontal drill. Gear is placed on ram nose (left) through opening. Ram clamps gear against end stop as drill (right) advances.

## *Pinions Are Milled . . .*



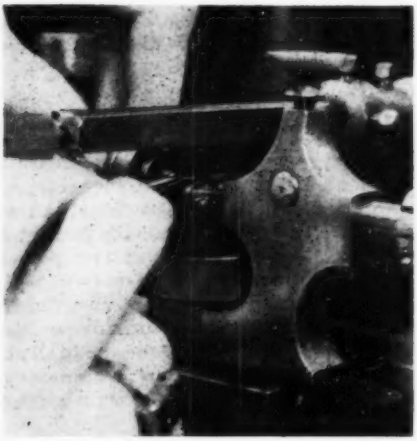
. . . when pinion pivots are extremely fragile and work must be held between centers. Front cutter roughs pinion, head advances, and rear cutter finishes teeth.

## *Pinions Are Hobbed . . .*



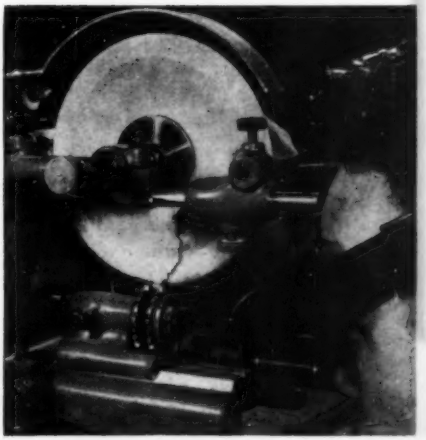
. . . when pinion pivots can stand heavier load. Hobs must be sharp, and spindle bearings must be adjusted carefully so both hob and spindle run absolutely true.

## *Carbide Bar . . .*

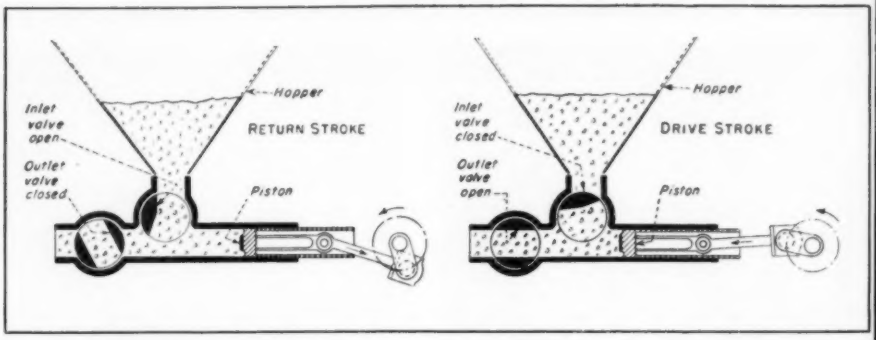


. . . polishes fragile pivots. One end is held in collet, and end to be polished in V-notch. Bar is reciprocated by hand about three times for high polish.

## *Wooden Wheel . . .*



. . . polishes pinion teeth. Wooden wedge driven into split in wheel spreads edges and so creates helix to rotate work one tooth per revolution. No compound is needed.




**CONCRETE PUMP MOVES FAT TRIMMINGS TO RENDERING**

**At E. Kahn Sons Co.'s meat-packing plant, fat trimmings were trucked to lard rendering tanks, and a messy job it was with eight men pushing hopper carts. But now a Cretepump, made by Chain Belt Co., delivers 30,000 lb. of trimmings per hr. through 200 ft. of pipe. Trimmings are simply dropped into chutes alongside the trimming conveyor that lead to pump hopper. Action of piston and two synchronized valves forces fat along the delivery pipe.—Food Eng, Jan, p9**

## Plastic Tooling Cuts Cost, Eliminates Scarce Material

Plastic tooling is paying big dividends in the aircraft industry—with savings in manhours, money, and material. Lockheed Aircraft Corp. makes 50 to 60% of its forming tools from plastics.

The company reports these benefits from plastic tooling:

- Shorter die-making time.
- Economies with scarce die metal.
- Quick and economical repair of tools.
- Easier handling of tools because of lighter weight.
- Aircraft parts of increased size, thus simplifying assembly, saving weight, and speeding output.

Plastic dies are constructed by first using a plaster-splash technique from a master. The splash mold is placed in an inverted die box, then is filled with a phenolic plastic poured through holes in the bottom of the box. The plastic is cured by letting the mold set overnight or by heating in an oven, generally about 8 hr. at 200° F.

When the plastic is cured, the plaster is knocked off and the plastic sprayed with primer to the thickness of the metal part to be made. Later the first plastic casting molds its mating die.—Aviation Wk, Jan 7, p42

## Indicators Cut Rejects

Quality-control indicators were installed at General Electric's Erie, Pa., refrigerator plant in Oct. 1949. Five characteristics were controlled. By December, rejects were stabilized at the process average. Now, rejects are down 60%.

GE's quality-control indicator did the job. It consists of an analyzer that analyzes the reject-production ratio each time a reject occurs, and a meter that shows immediately when the upper control limit is exceeded.

When the inspector rejects a part, he pushes a button to record the reject and the cause for rejection. The production manager keeps track of reject

characteristics with a bank of indicators along his office wall. If the needle reads green, reject-production ratio is OK. If the needle moves into the red, rejects are too high. The production department must take fast action to stop them.—Factory, Jan, p128

## Better Tapping, Drilling

Oil-mist lubrication has been applied to machining of metals. One company set up a Kingsbury seven-station machine to drill and tap a half-hard brass part. Trouble developed in tapping the 0.277-in., 40-pitch thread.

So an Alemite Oil-Mist lubricator was mounted on the machine and the spray nozzle directed at the tap in its raised position. A 20-psi. air pressure sprays kerosene over the tap to clean and cool it. More than 15,000 pieces are tapped before regrinding. High-speed-steel tap runs at 48.6 ft. per min. with 0.025-in. feed. Tap is sprayed during idle time of 3 sec.

Another machining job for the lubricator is in drilling aluminum. A $\frac{5}{16}$-in. drill, run at 3,600 rpm., is sprayed with spindle oil at 5-psi. air pressure. Results: longer drill life and no tears or grabs in the aluminum.—Am Mach, Jan 7, p121 and 165

## Eliminates Darkroom Need

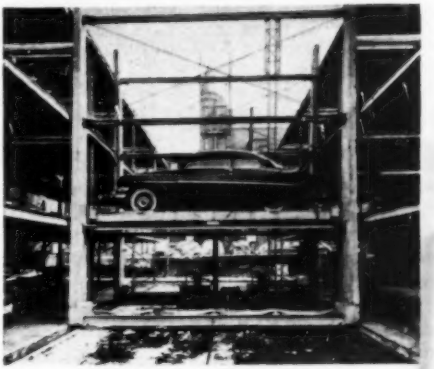
Trans-Gel Products Co. chemically reproduces photographs, blueprints, or printed matter on almost any type of sheet material. Sheet can be porous or nonporous, organic or metallic. No darkroom is needed.

The sheet material that is to carry the reproduction is first coated with a gelatin emulsion. A negative goes on top. The gelatin coating is sensitive only to concentrated ultraviolet light. Exposure to a carbon-arc lamp activates the coating.

After exposure, the coated sheet is

## Pigeon-Hole Parking . . .

### . . . with Mobile Elevator . . .



. . . at Spokane parking lot is making revolutionary bid to solve problem of congested streets. Car is placed on elevator by transfer carriage; elevator rolls down corridor on rails and lifts car to proper level where it is deposited in selected pigeon hole. Elevator . . .

### . . . Stacks Cars Four High . . .

. . . for a total capacity of 142 cars. Parking cars four deep and eliminating ramp and driveway enables small area to handle more business. Cars do not have to be shifted when other cars go out. Result: faster service, fewer dented fenders.—Elec C&M, Jan, p114

dipped in a dye of any desired color. Exposed parts of the coating soak up the dye and reproduce the image.

The process can handle a combination of colors. Each color requires a separate exposure and dipping.—Business Wk, Dec 15, p50

## Radioactive Power Source

Radioactivity can now be applied as a source of electrical energy by an "atomic battery" developed by Ohmart Co. Energy conversion is made by a cell consisting of two dissimilar materials separated by argon.

When the cell is connected to an ammeter and the argon is ionized by nuclear radiation, the positive ions and electrons formed are attracted to opposite electrodes, thereby setting up an electric current. The cell is primarily intended to measure nuclear radiation, not as a power source. Other uses include corrosion measurement, analysis of alloys, analysis of gases, and measurement of vacuum, pressure, and temperature.—Electronics, Jan, p212

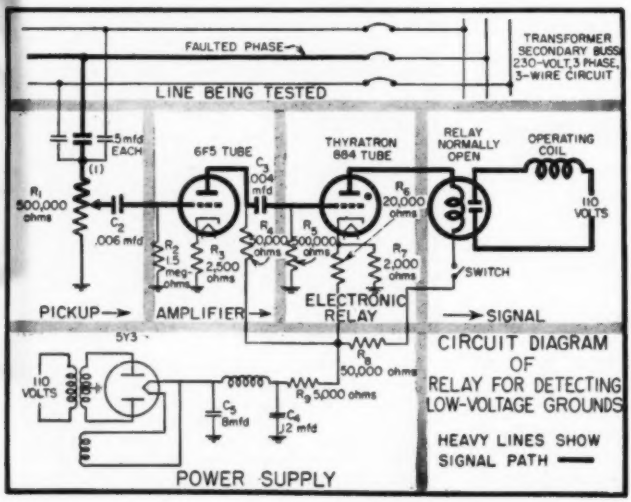
## How To Detect Low-Voltage Grounds As They Occur

Many underground mines have a three-phase, three-wire, delta-connected, 230-volt, a-c. distribution system. Phase-to-phase faults are usually protected, but not ground faults. Yet insulation failures in mining machines, equipment, and trailing cables, probably cause most electrical troubles. The device illustrated below automatically detects ground faults to minimize hazard to the operators of the equipment.

If a fault exists in any phase, the potential at (1) is shifted from neutral, and current flows to ground through potentiometer $R_1$. ($R_1$ is set at a sensitivity that satisfies local conditions.) The signal is then amplified in the 6F5 and, still too weak to operate a mechanical relay, it triggers the thyratron tube into conductance. Current from the thyratron closes the contacts of the normally open relay.

For ground detection, an auxiliary relay may be placed in the relay circuit to sound an alarm or turn on a warning light. If circuit isolation is desired, the auxiliary relay can operate the shunt trip coil of the secondary low-voltage breaker.

Advantages of the detector are: (1) it is inexpensive, (2) no fourth wire is needed, (3) it can be adjusted to suit local conditions, and (4) it has a wide range of sensitivity.—Eng & Min J, Dec, p81.




***CIRCUIT DIAGRAM shows detector's operation***

# Electro-Organic Chemistry

**Long neglected, electro-organic chemistry may show itself to be one of the practical methods to produce hard-to-make chemicals**

ELECTRO-ORGANIC CHEMISTRY is a formidable sounding name. But the chemists and chemical engineers are beginning to think more about it and look to it for the industrial synthesis of organic compounds through liquid-phase oxidation and reduction.

The electro-organic process works like any other electrolytic action. Oxidation takes place at the anode, and reduction at the cathode. A porous diaphragm may separate anode from cathode to prevent mixing of oxidation and reduction products.

In electro-organic chemistry, the organic material to be oxidized or reduced usually acts as a depolarizer. So the material absorbs oxygen at the anode and hydrogen at the cathode. The amount of oxidation or reduction depends on the usual variables of temperature, agitation, catalysts, reactant, and solvent, as well as the variables peculiar to electrochemistry:

1. Current density. An increase raises over-voltage at electrodes. Typical values are 30 to 50 amp. per sq. ft.

2. Current concentration. If it is allowed to rise excessively, the bath heats up.

3. Nature of electrode material. Both chemical composition and physical structure are important. Anode materials are iron and nickel for alkaline solutions, carbon and graphite for both acid and alkaline solutions, and platinum and sometimes lead for acid solutions. Cathode materials are copper, zinc, cadmium, mercury, tin, and lead.

4. Applied voltage. Cell voltage is one factor determining products formed.

Despite the many process variables, their careful handling achieves precise direction of a desired reaction. Yields obtained are comparable in many cases to those from other synthetic methods. Energy requirements are high, so efficient current utilization and low-cost power are necessary.

**Commercial Applications** — Neither electro-organic oxidation nor reduction have been widely practiced to date. One installation oxidizes anthracene to anthraquinone. Anthracene is dissolved in sulfuric acid, and a platinum anode is used. Added carrier salts have proved ...ective.

During World War I, nitrobenzene was reduced to para-aminophenol on a fairly large scale. This is the Gattermann reaction.

An electro-organic oxidation process attracting considerable attention is the electrochemical manufacture of fluorocarbons by Minnesota Mining & Manufacting Co. The solvent for the organic compound to be fluorinated is hydrofluoric acid. The voltage of 5 to 8 volts is not high enough to generate free fluorine but does produce fluorine-containing compounds.

The relatively insoluble products either evolve with cell gases or settle to the bottom of the cell and are drained off. Anodes are nickel; cell and cathodes are iron and steel. No diaphragm is needed.

Reactions recently suggested for the electrochemical process include:

- Reduction of maleic acid to succinic acid. This involves reduction of the carbon-carbon double bond in an unsaturated acid without reducing the acid to the alcohol.
- Reduction of pyridine to piperidine. This involves reduction of double bonds

in a heterocyclic ring to give a saturated compound.

• Reduction of caffeine to desoxycaffeine. This involves reduction of a carbonyl group to a $CH_2$ group without reducing any double bonds in the caffeine molecule.—Chem Eng, Jan, p150

## High-Rake Milling Cutter

Redesigning milling cutters at Allis-Chalmers Mfg. Co. has increased feed rates by 300% and cutting speeds by 70% in machining corrosion-resistant steels (similar to type 403 stainless steel). Parts machined are steam-turbine blades.

The cutter was a 4-in. dia., 4-in. long, heavy-duty 18-4-1 high-speed-steel helical slab mill. It originally had a 10° rake and 5° clearance, which were increased to 26° rake and 11° clearance.

After angles were ground, edges were hand-stoned to eliminate feather-edge burr and so prevent chipping of the cutting edge.

Results: speed boosted from 105 to 177 rpm., feed rate from 8 to 36½ in. per min., chip load from 0.014 to 0.0257 in. Power consumption was cut 40%.—Am Mach, Nov 26, p125

## Additive Cools Tools

Metalloid Corp. claims its new additive for cutting fluids called Oilcut X-20 will lengthen the lives of tools by reducing the generation of heat.

Oilcut X-20 makes the surface of the workpiece brittle just before the tool cuts it. Then the chips snap off without too much heat. It works much like the hardening effect from carburizing or heat-treating. The additive in the cutting fluid releases individual atoms of carbon, nitrogen, and chlorine, which react with the freshly exposed metal at the point of cut. It makes the metal surface brittle for each succeeding cut.—Business Wk, Jan 12, p48

## Aluminum Replaces Copper in Many Electrical Products

Electrical equipment manufacturers in the U. S. are saving copper by substituting aluminum. General Electric Co. has replaced its brass lamp bases with aluminum. Windings of smaller motors are now aluminum. Distribution transformers with aluminum coils will soon go into production. Bus and connecting bars of aluminum for switchgear will come later. Windings for large motors and generators are still in the research stage.

Okonite Co. supplies insulated cables with aluminum conductors. It has concentrated primarily on insulated power cables such as underground or self-supporting aerial cables.

John A. Roebling's Sons Co. plans to manufacture service drop cables with

DRIVES SAFETY STAKES

Stakes are driven in a matter of seconds along the New Jersey Turnpike by this self-contained rig. A Schramm Pneumatractor is fitted with a cantilever bar carrying a wagon-drill guide holding a paving breaker as a hammer. Three-man crew works with the rig. One drives the Pneumatractor and positions it along the shoulder, one sets the stake in the drive head and operates the hammer, one lines up the stake.—Const Meth & Equip, Jan, p98

aluminum conductors, neoprene and polyethylene insulated aluminum line wire for overhead distribution, and insulated aluminum parkway and network cables for low-voltage service.—Elec World, Jan 7, p7

## Electrodeposits Cast Iron

The Van Der Horst Corp. of America's new Vanderloy-M plating process renews, for about a third less than new replacements, such items as worn power and compressor cylinders and crankshafts.

Microscopically, this electrolytic iron plate develops a fine, columnar structure, with the close packed, columnar grain perpendicular to the surface with which it is bonded. The bond between Vanderloy-M and the base metal is indestructible.

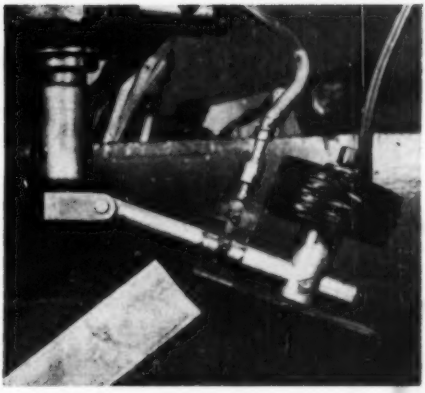
Deposits can be made of ¼ in. or greater radial thickness. The bath is stable and produces these results within practical limits of current density and working temperature. Parts can be masked with low-cost wax.—Railway Age, Dec 3, p15

## New Agricultural Airplane

Piper Aircraft Corp. has developed a light agricultural airplane capable of spraying up to 220 acres in 45 min. with a single load of chemicals. Gross weight of the craft is 2,770 lb.; empty weight is 840 lb. The rear fuselage holds a 110-gal. tank accessible through demountable aluminum sections.

For spraying, the plane has a streamlined boom under each wing, having 12 spray nozzles. Booms are hinged for safety.

The dust unit has both slots and scatter plates, useful in providing a wide swath and good penetrating effect. Double agitators at the bottom of the hoppers provide a uniform flow of dust. —Aviation Wk, Jan 7, p15



***DRILLING SETUP** with work at lower left and electrode on pivot bar shows how . . .*

## New Electric-Arc Drilling Produces Curved Holes

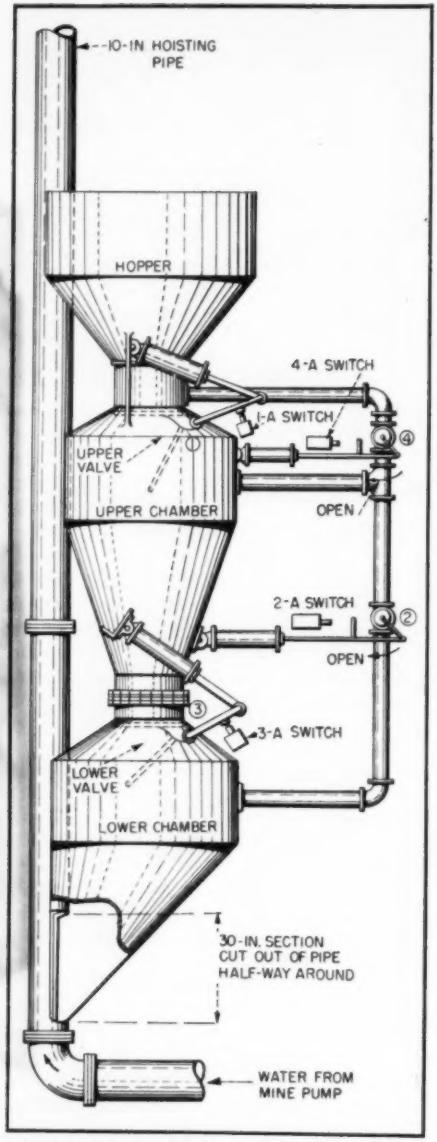
Drilling holes along a circular path is possible with an electric-arc method developed at Westinghouse Electric Corp. Equipment needed is a disintegrating machine, the Thomas Metal Master, equipped with a special drilling jig as shown above.

The machine ordinarily makes a straight hole by heating the metal with an electric arc, then quenching it with a coolant passed through the center of the hole-drilling electrode. The arc is produced by vibrating the electrode.

To drill a curved hole, the electrode is shaped to the radius required. The special jig guides the electrode along the path of its arc.

Vibrating mechanism consists of a coil and brass tube with a steel anvil sliding inside the tube. When the coil is energized, the anvil slides to the top of the tube and strikes it with enough force to raise the whole assembly on its pivot bar and so break contact for a moment at the electrode.—Prod Eng, Jan, p198

# New Ore Pump




***THESE TWO CHAMBERS** are the key to operation of the hydraulic hoist*

THE EXPERIMENTAL hydraulic hoist installed at Calumet and Hecla's zinc mine in Wisconsin pumps ore a vertical distance of 365 ft. Total headroom for the loading chambers below the 330-ft. station is 22 ft. The hoisting column is regular 10-in. pipe installed in a shaft compartment. Five pumps delivering approximately 2,000 gal. per min. from various underground sumps feed this column.

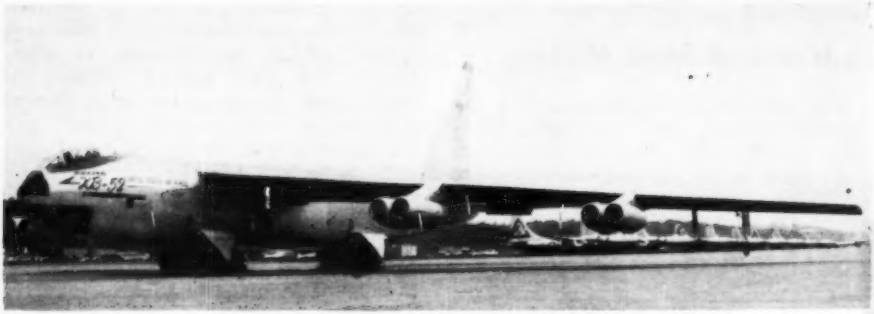
Ore is crushed underground to 4 in., loaded through chambers, and hoisted to an overflow box above the shaft collar, thence to a dewaterizer. About half the ore is in excess of 4 in., some of it 8 or 9 in. in length.

Chambers are now loaded by hand in 1- or 2-ton batches. Future loading will be done by conveyor belt.

Capacity for hoisting with 2,000 gal. per min. will be 120 tons per hour with 2-ton charges. Increasing the flow of water to 2,500 gal. per min., this capacity can be increased to 240 tons per hour with a loading cycle of 30 sec., or by doubling chamber capacity with a 1-min. cycle.

Static pressure on the chambers with water at rest is 155 psi. Pressure with water in motion is 160 psi. There is no appreciable change while rock is being hoisted. Ammeter reading on one motor in motion was 87 amp. Reading did not change with rock being hoisted.

The double-chamber unit works like this: a batch of ore drops through the hopper into the upper chamber; the upper valve closes; high-pressure water from the lower chamber is by-passed to the upper chamber to equalize pressures in the two chambers; the lower valve drops by gravity permitting the ore charge to drop to the 30-in. cut-out in the hoisting pipe.—Eng & Min J, Jan, p94



BOEING STRATOFORTRESS UNVEILED

Shown is the first official photograph released by the U. S. Defense Dept. of the big eight-jet Boeing Airplane Co. heavy bomber. U. S. Air Force has disclosed these facts about the XB-52: the big bomber weighs over 300,000 lbs., with experimental cost about $250 per lb. Electrical requirements are about 200 kw., or enough for 300 average homes.—Aviation Wk, Jan 14, p14

## Once-a-Year Shutdown for Electrical Maintenance

The General Aniline Works, Grasselli, N. J., runs its chemical plant 24 hr. a day, 7 days a week. That leaves little time for important maintenance on the electrical network. So management planned a 3-day shutdown of the entire plant on the Labor Day weekend. With the shutdown planned in advance, production scheduling is set up so that cost of the interruption can be kept to a minimum.

The annual plant shutdown points up these advantages:

- It gives the electrician a chance to do the job right.
- Jobs that ordinarily would have to be done next to a "hot feeder" can now be done with perfect safety during the shutdown. Considerable time is saved.
- The main power distribution network from the powerhouse to each transformer station and building can be thoroughly checked. No doubt is left as to its operating condition.

Shutdown work is divided into three parts: annual, routine maintenance, major maintenance projects, and new installations. Most of this work would be hard if not impossible to do while the plant was operating.—Factory, Dec, p104

## Cohesive Package Material

Cohesive papers adhere only to themselves and require merely the application of pressure to obtain a secure closure. A specially compounded rubber derivative coating gives the material its unique self-sealing property.

The coating may be applied to one side of many types of papers to render them self sealing. Various laminations of self-adhering paper make other packaging materials possible. Properties of the finished sheet can be adjusted to obtain the desired degree of product protection; the nature of the product dictates the quality of vapor barrier necessary.

Applications include: food wraps; forming flat, thin packages; small unit packages; and packaging heat-sensitive products.—Mod Packaging, Nov, p82

## What To Look For in 1952 in Iron and Steel Making

• Thin shell molding, often called the Croning process, will really get underway. It will allow switching many parts from steel to less critical materials like malleable or cast iron. A new bonding agent will be tried this year.

• Also new will be a method for making ductile iron that will not use nickel, magnesium, cerium, or any strategic metal. Look for greater tonnages and more applications.

• Saving of alloys will continue throughout year. Users will go to either straight carbon steel or boron steel containing nickel, molybdenum, or chromium, but the 14BXX series for carburizing (carbon steel plus boron) will not be given much attention.

• Interest in continuous casting of steel will run high, but big producers are still saying, "No."

• Look for wider use of rare earths in steelmaking. Old Misch metal practice will be discarded, and more information, now confidential, will soon be released.

• Reducing sulfur content in steel will continue to be studied. Steel-makers may have to adopt an extra operational method of sulfur reduction. They also will add new facilities to recover manganese from openhearth slags.—Iron Age, Jan 3, p253

**SKY ADVERTISING IN GERMANY**

**A firm in Salzgitter-Bad has developed a 4.5-million candlepower projector to bounce advertisements off cloud banks in the night sky. The inventor says the cannonlike device can beam a message 16,500 ft. up, visible 8 mi. away.—Business Wk, Dec 29, p103**

## Spray Booth on Wheels

For finishing railroad passenger cars, the Pullman Co. has installed a new type of spray-painting and air-exhaust equipment. It consists of a spray booth that travels under its own power back and forth along the sides of the cars while, at the same time, filtering, washing, and exhausting the spray-laden air. DeVilbiss Co. designed and erected the booth for Pullman.

The spray booth, driven by electric motors, is built in an inverted-U form. In operation, the booth straddles a car. Each side of the booth has a working space where the painter stands on a power-operated scaffold. Each side of the booth is also provided with an air-wash exhaust system, a paint tank, a spray gun and hose, and an air compressor.

The new unit provides greater overall efficiency than the fixed, conventional spray booth. Operating expenses are reduced and car painting time has been cut deeply.—Railway Age, Dec 24, p29

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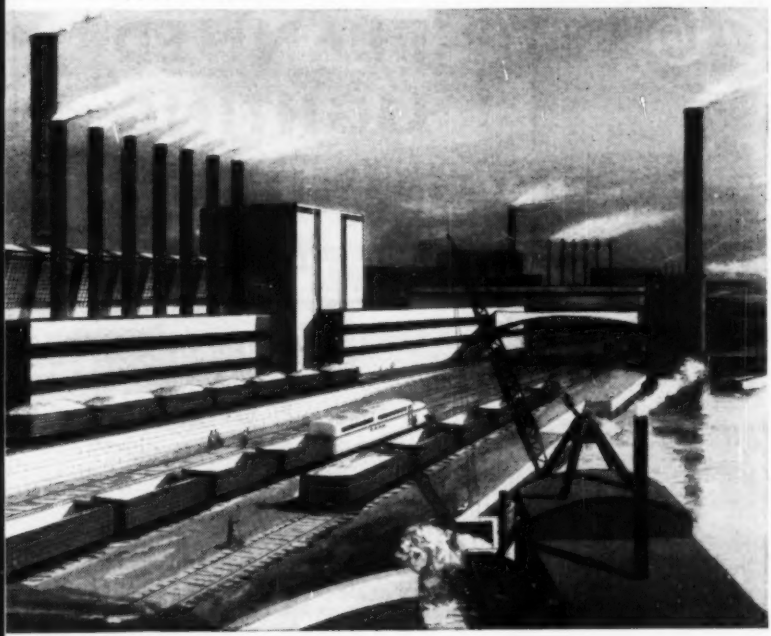

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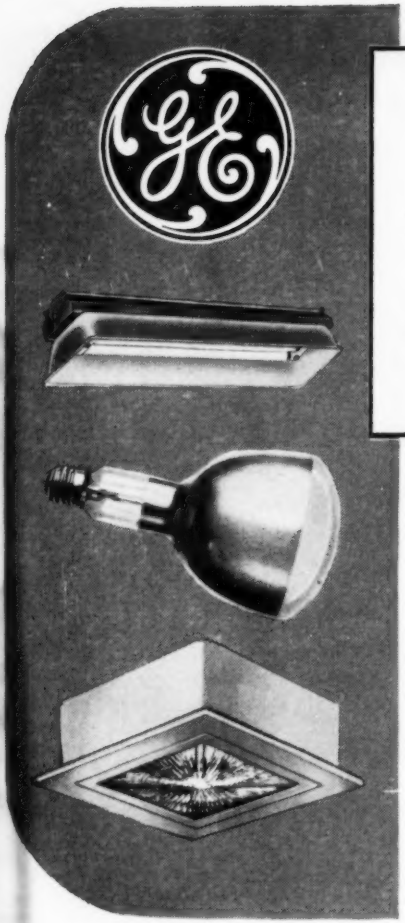

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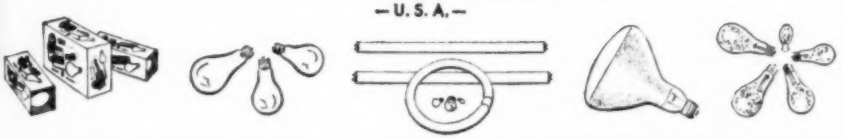

# PRODUCTION IDEAS

## from Manufacturers' Catalogs

**3-1 Air-conditioning Equipment** — Servel, Inc. 32p. Two bulletins—1ACP-81-304 and 1ACA-99-10 — describe applications and gives extensive operating data on 25-ton water chiller.

**3-2 Forging Equipment**—Ajax Mfg. Co. 76p. Folder "Hot Metal Working Machines" in five bulletins—Nos. 64, 64-S, 65-C, 75-B, and 91-A—describe bolt heading machines, forging machines, forging presses.

**3-3 Commercial Refrigeration**—Tyler Fixture Corp. 28p. "Facilities Report" tells of the care and work that go into manufacture of refrigeration equipment.

**3-4 Industrial Trucks**—Baker-Raulang Co. 22p. Bulletins 1327 and 2100 cover type FS 2,000-lb. fork truck and the maintenance of industrial trucks.

**3-5 Metal Cutting**—Cincinnati Milling Machine Co. 27p. Paper reprinted from Annals of New York Academy of Sciences covers technically the fundamental aspects of metal cutting and cutting-fluid action.

**3-6 Industrial Lighting** — International General Electric Co. 47p. Bulletin LD-4 tells how to engineer lighting jobs, what lights to use, and how to apply many special techniques.

**3-7 California**—Bank of America. 28p. Large-size pictorial presentation gives facts about the California market. Get this one if you are selling there or want to enter that market.

**3-8 Industrial Adhesives**—Armstrong Cork Co. 32p. Catalog IND-530-451A is a complete treatise on adhesives—what kind to use, when to use them, how to use them.

**3-9 Packaging Machines**—Standard-Knapp Div., Emhart Mfg. Co. 46p. Eight bulletins cover bottle and can packers, can packers and boosters, labelers, rinser, cartoning machines, collectors and packers, gluers and sealers, and envelope vacuum sealer.

**3-10 Quality Control**—Sheffield Corp. 20p. Bulletin QC 5-51-75 gives case studies on use of gaging instruments in statistical quality control.

**3-11 How To Kill Pests**—Pennsalt International Corp. Folders 204 and 205 tell how to kill insects with lindane, DDT, and BHC.

**3-12 Diesel Tractors**—International Harvester Export Co. 48p. Catalogs E-78-A and E-79-A cover TD-14A and TD-18A crawler tractors of 66 and 89 drawbar hp. and matching auxiliary equipment.

**3-13 Calculates Steam Costs** — Cleaver-Brooks Co. Slide-rule calculator makes it easy for plant engineers to compute comparative steam costs for coal, oil, or gas.

**3-14 Look to Asia**—National City Bank of New York. 36p. Three bulletins tell of the problems and business prospects in the Philippines, Japan, and Singapore.

**3-15 Machines Tools**—South Bend Lathe Works. 56p. Two miniature accordion-folded catalogs—5104 and 5119—describe line of lathes, drills, shapers, and attachments.

**3-16 Boiler Feed Pumps**—De Laval Steam Turbine Co. 12p. Bulletin 1525 describes high-pressure barrel-type pump and its automatic thrust balance.

**3-17 Sewage Treatment**—Dorr Co. 20p. Dorr Detritor, which removes grit from sewage and trade wastes, is covered in bulletin 6411.

**3-18 Irrigation Pumps**—Gorman-Rupp Co. 28p. Form 9-IR-11 illustrates line of pumps for irrigating farm land in capacities of 80 to 1,200 gal. per min.

**3-19 Cleans Metal Parts**—Phillips Mfg. Co. 21p. Question-and-answer handbook treats fully vapor degreasing.

**3-20 Cut Materials-Handling Costs**—Yale & Towne Mfg. Co. 24p. "The How Book of Cost-Cutting Materials Handling" does just that by offering a logical evaluation method.

**3-21 Disk Dictating**—Thomas A. Edison, Inc. 12p. "Distinctly Yours" describes disk dictating machine and reproducer.

**3-22 Boring Machine**—B. M. Root Co. 36p. Catalog 173 illustrates many types of boring machines for wood and plastics.

# PRODUCTION IDEAS (Cont.)

**3-23 Industrial Waxes**—International Wax Refining Corp. 16p. Booklet describes waxes, their properties, and uses.

**3-24 For the Oil Man**—Lummus Co. 60p. Three bulletins tell of Lummus' part in building Cit-Con's new refinery, Pan-Am Southern's delayed coking unit, and Magnolia's heater installation.

**3-25 Portable Drill**—Guibert Steel Co. 6p. Togglebug is portable drill press to drill, ream, countersink plates and billets.

**3-26 Induction Heating** — Ajax Electrothermic Corp. 8p. Bulletin 27A-5M-5/51 covers melting, forging, other heating applications with induction furnaces.

**3-27 Air Tools**—Rotor Tool Co. 44p. Catalog 38 presents all types of air tools for foundry, mill, production, assembly line.

**3-28 Paper Sizer**—Hercules Powder Co. 12p. Bulletin PM47 offers new automatic emulsifier for rosin size in paper mills.

**3-29 Potentiometers** — Minneapolis-Honeywell Regulator Co. 40p. Bulletins B15-12 and B15-13 give detailed technical information on Brown Electronik potentiometers.

**3-30 Panel Lighting** — Sylvania Electric Products, Inc. 6p. Panelescent folder tells of new lighting method (McG-H Digest, Oct '51, p25).

**3-31 Chemical Processing** — Read Standard Corp. 12p. Processing equipment and air blowers are illustrated in bulletin 51759.

**3-32 Plastics Injection**—Van Dorn Iron Works. 14p. Six leaflets describe different-size injection presses, scrap granulator, molds.

**3-33—Barrel Finishing**—Norton Behr-Manning Overseas Inc. 56p. Handbook covers tumbling with aluminum oxide abrasive.

**3-34 Package Pumps**—Allis-Chalmers Mfg. Co. 6p. Bulletin 52B7529 covers package pumps for wide range of fractional horsepower jobs, including air conditioning.

## About Catalogs

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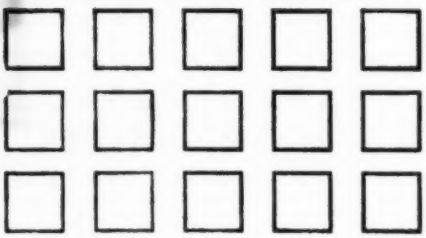

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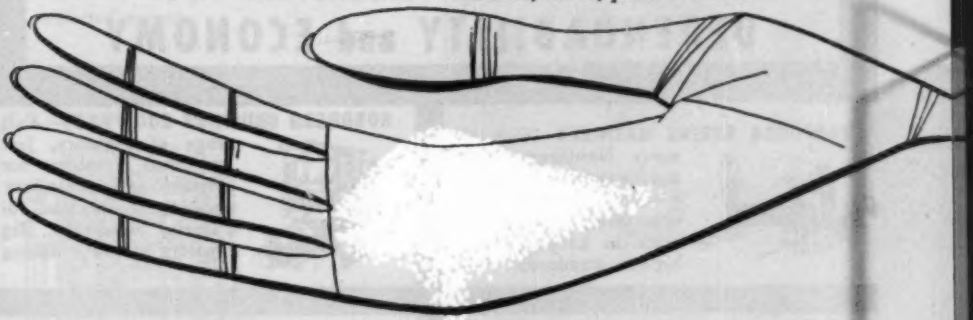

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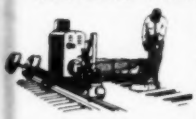

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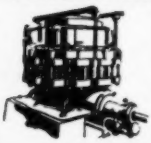

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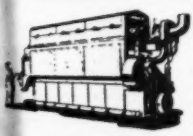

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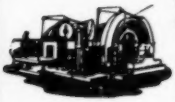

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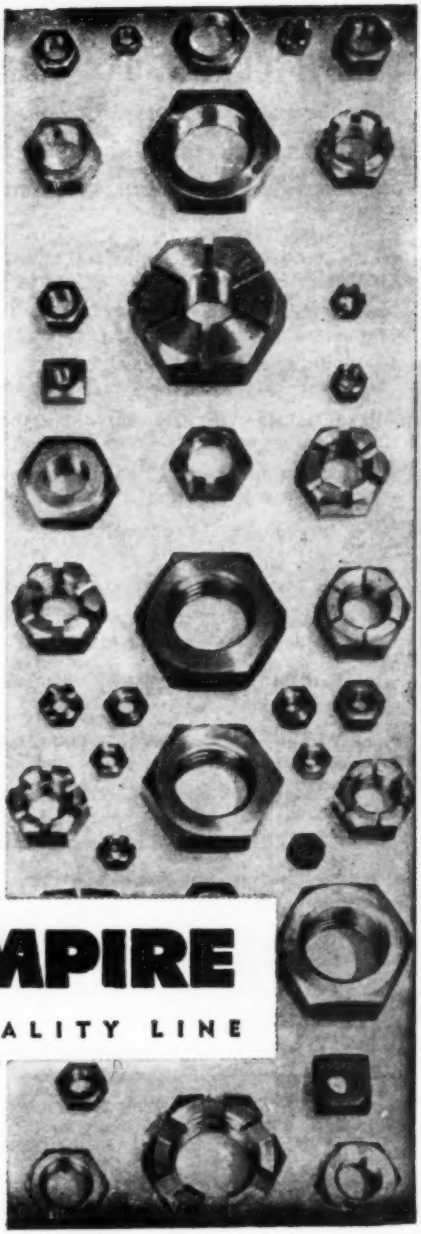

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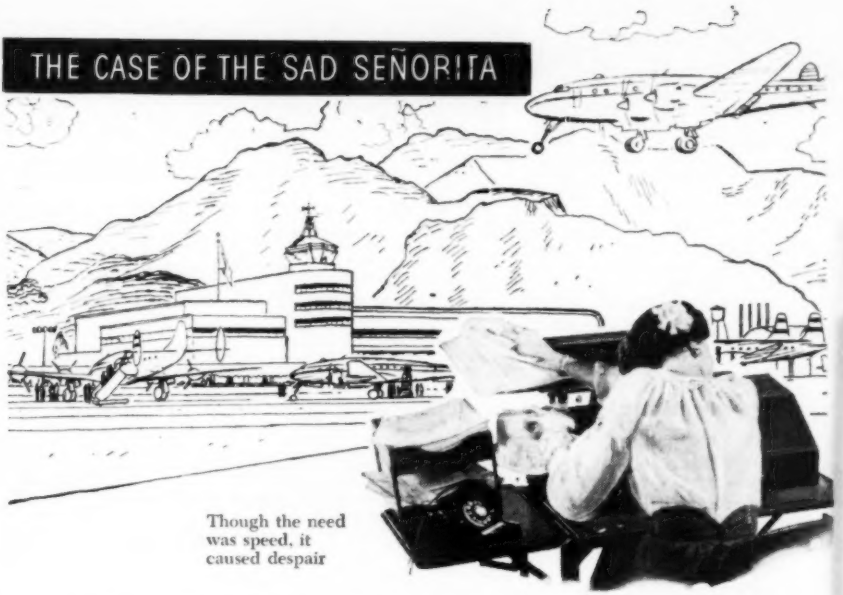

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**Chilton Company, Chestnut and 56th St., Philadelphia 39, Pa.**
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**Dartnell Publications, Inc., 4660 Ravenswood Ave., Chicago 40, Ill.**
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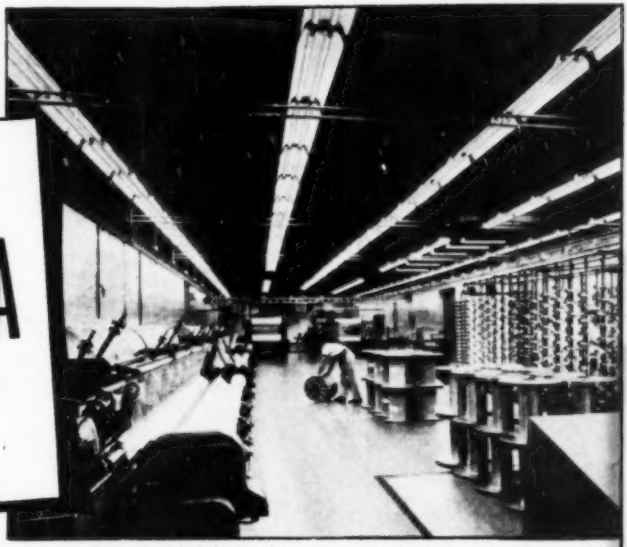

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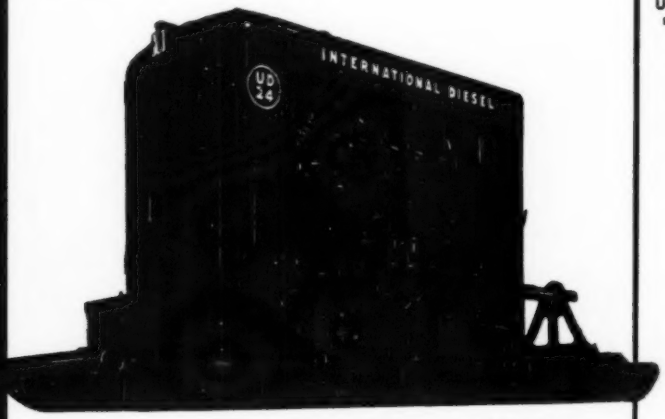


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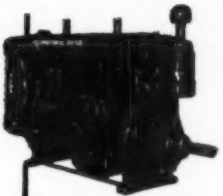

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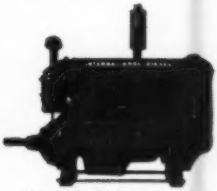

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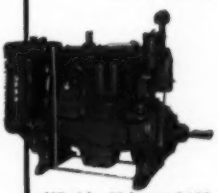

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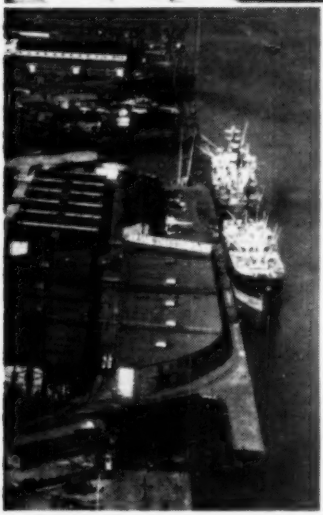

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